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INDISPENSABLE ORTHOPAEDICS

A HANDBOOK FOR PRACTITIONERS

BY

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TRANSLATED FROM THE SIXTH FRENCH EDITION

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SECOND PART

ACQUIRED DEVIATIONS, NON TUBERCULOUS

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CHAPTER VIII

SCOLIOSIS

Amongst the orthopædic affections, scoliosis is, I believe, that which most embarrasses the practitioner.

In the presence of the multiple and diverse theories held by authors as to the nature of this malady, he does not know what to believe : among the different treatments proposed, he does not know which he must choose, and if he choose one, he does not know exactly in what way to apply it, in order to reap some benefit. In the end he does nothing.

I call it doing nothing, and avoiding doing anything, when he confines himself to prescribing strengthening wines, and furnishing the address of a manufacturer who will make some kind of corset, and thus free himself from all responsibility.

How **disastrous** to the patient is this **inertia of the practitioner** who sees the scoliosis from the onset, from the moment when it is yet so slight!

And how annoying it must be to the practitioner himself, who will be held in poor esteem by the parents, when they see their child become more and more deformed without anything being done to prevent it.

I would like to react against this tendency and to persuade practitioners that they are able, and ought henceforth, to assume a different position with regard to the "**essential scoliosis of adolescence**". They must look the malady in the face, frankly, bravely, and deal with it with the same confidence they deal with the other orthopædic affections. They will triumph over this malady as well, if they know how to **track** it from its **earliest hour**, and **apply** to it **without delay** the **treatment** we are going to describe.

In this description I have endeavoured to be explicit, practical and useful. Having made use of all the treatments, I will describe, without any biased opinion, that which appears to me the best. But, beforehand, I ought to point out the means of tracing scoliosis from the beginning.

Diagnosis. — I shall deal, in this chapter, only with the essential scoliosis of adolescents, or **common scoliosis**¹. It is easy to recognise the existence of the condition from its onset. There is brought to you an adolescent, nearly always a young girl, whose parents tell you she has held herself badly for some time, in spite of their remarking upon it, or the mother has noticed in undressing her — more often it is the dress maker or the stay maker who has made the remark — that the child has one **shoulder** a little **larger** than the other, or one hip **projecting**. This has been a revelation to the parents, who had had no suspicion of any deformity up to that time. It must be growth, the parents hasten to add, for the child has shot up very quickly, too quickly : that has fatigued her.

In fact, you see a young girl of from 12 to 14 years of age, rather emaciated, a little anæmic, somewhat flabby and easily tired, catamenia not yet appeared, or if so, irregular.

When a child is placed before you with these appearances, you think at once of the existence of scoliosis. You must ascertain this at once by proceeding to an **examination** of the vertebral column, the **entire back being uncovered**. Whilst the mother is undressing her (which always takes some time) you interrogate her as to the **hereditary** or **personal antecedents** of the child.

1. 36 varieties of Scoliosis have been described ; the essential or “habitual”, the rachitic, the constitutional, the static, the neuro-pathic, etc. One can reduce all these varieties to the three following :

1st. **The scoliosis of adolescence**, of which we are now speaking.

2nd. **Rachitic scoliosis** — that which begins at, or rather is recognised at 3 years, 5 years, 8 years. — It is distinguished by important characteristics, and by its very grave prognosis : it will be studied in the chapter : **Rachitic deformities**, Chap. x.

3rd. **Symptomatic scoliosis**, which includes :

a). *Static scoliosis*, that is symptomatic of an inequality of the lower limbs (coxitis, congenital luxation of the hip, infantile paralysis, etc.) in which cases one must treat the maladies, or compensate the inequality of the limbs with a boot ;

b). *Symptomatic scoliosis*, symptomatic of some other affection altogether (and these casual affections are very numerous) ; empyema, thoracic affections, hemiplegia, the contractions of torti-collis, etc.

Sometimes the mother declares there was an aunt, or a grandmother, who had a deformity of her spinal column. Sometimes the mother tells you nothing; but her own figure, her rather round back, her unequal shoulders, speak for her.

As to personal antecedents, never omit to enquire how the child has been brought up. You will generally learn that she has been bottle-fed, or by a series of indifferent or manifestly bad nurses. Enquire if she has had **digestive trouble**, because in these children repeated enteritis is nearly always the rule, also constipation with a large abdomen and offensive stools. Make a note of previous debilitating diseases, such as whooping cough, broncho-pneumonia, eruptive fevers, etc.

Remembering that **scoliosis** is the "**school disease**" (the bad position often brought about at school, or discovered there), inform yourself of the number of the child's class hours and of her attitude in writing.

But now she is undressed, the back in full view, in front of you, the arms close to the body. You tell her to fix her eyes straight before her, on some point you indicate.

On looking at her back, you are struck by the **difference in height** of the two **shoulders**, by the **absence of symmetry** of the **two scapulae** (one is much nearer the middle line than the other), by the **projection** of one of the **hips**, and by the **difference** of the **two triangles** which the **arms form** with the corresponding side of the trunk and the pelvis. These signs seem to grow — if you leave the girl for a time upright.

This strikes one often more than a deviation in the line of the spinous processes; a deviation which is, in fact, only a little or not at all apparent. To reveal it, you trace the line of the spinous processes with a crayon, or more simply, by pressing with your index finger over all the processes from above downwards. A rather vigorous pressure in this way and repeated two or three times, leaves a red line which gives you the line of the **spine**, and you easily recognise that



Fig. 605. — Scoliosis. Single convex curve on the right side.

the line is **no longer rectilinear**, but that it **describes a curve** towards the right or towards the left, sometimes opposite the lumbar, more often opposite the dorsal region (fig. 605).

Make the child bend forwards, the arms hanging; in this position you will see the deviation of the processes become obliterated, but then there will appear a slight arching of the ribs on the convex side of the dorsal spine (fig. 606).

Your **diagnosis** of Scoliosis is made.

Nevertheless, you examine the chest, which may be already a little (very little) asymmetrical; percuss and palpate the abdomen to judge of the general condition of nutrition; do not forget to ascertain there are no ocular troubles, or adenoids, or **inequality of the legs** (measure very carefully, see fig. 392).

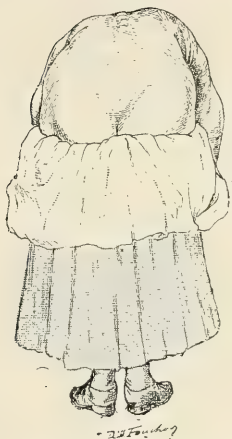


Fig. 606. — Make the patient bend forwards, the arms hanging: one sees, outlining itself, the asymmetry produced by the arching of the ribs on the convex side.

Differential Diagnosis of Scoliosis.

a. Normal back: the positive characters of scoliosis indicated above are wanting here (line of shoulders, projection of hips, brachial triangle, deviated line of spinous processes).

b. Pott's Disease (see Chap. v). The curve of Pott's disease is **median** (and not lateral); it is not a long curve (as in scoliosis) but an acute projection, a spinous process fallen out of the rank. More than that, **in Pott's disease** there is **pain** on pressure over one or several spines; there is a **rigidity**, a marked **stiffness** of the back: the **two shoulders**, the **two hips**, the **two lateral triangles** are **symmetrical**, at least when the disease is not in an advanced stage, in which case the lateral inclinations may be superadded to the original inflexion: but at this period of Pott's disease no comparison is possible.

Such is the almost constant rule. Nevertheless, there exists, in children in indifferent general condition, scolioses with very slight lateral deviation and even slight pain on pressure over a spinous process: where there is a meeting point of two lateral curves, superimposed; sometimes such process makes a slight projection (v. Chap. v).

Ascertain the existence of these lateral deviations, more or less distinct above and below the sensitive point: make sure that the move-

ments of the spine are free, and that the median projection is almost nothing and the pain scarcely appreciable, and that will enable you, **in these difficult, but fortunately rare cases**, to make a diagnosis. In doubtful cases, make no positive statement, ask to see the child again : the diagnosis will rapidly become certain, by the development of the disease.

Prognosis. — It is necessary to guard you against two prejudices, opposed and contradictory to one another, equally unreasonable, sinister and of old standing. The first is that scoliosis always cures itself. The other, contrary one, is that scoliosis is never cured.

Scoliosis does not become cured spontaneously; or rather, spontaneous cure is so exceptional that it would be foolish to depend upon it and to abstain from undertaking treatment. If, in children of very good general nutrition, particularly boys, one may have seen scoliosis in an early stage, once in a hundred times, arrested of itself, that may not do away with the necessity of active therapeutics. On the contrary, if there are found at the other end of the scale and in opposite conditions, children who are pale, breathless, rachitic, languid, with grave hereditary defects, in whom the scoliosis is of a malignant form and with a tendency, almost invincible, to become aggravated whatever one may do, the case is just as rare and exceptional, in essential scoliosis at least, and we ought not to take it into account. It is not upon very rare exceptions that a line of conduct can be based.

One may say, and you ought to remember it, that the **future** of your scoliosis **will depend** upon the **period** at which you have **commenced the treatment**, and upon **the way** in which you have carried it out.

Three degrees. — One has distinguished three periods in scoliosis when left to itself :

1st degree. — Scoliosis with a single curve, to the right or left, dorsal or lumbar, of recent date (fig. 605 and 606).



Fig. 607. — Scoliosis with a double dorsal curve on the right and a lumbar one on the left.

2nd degree. — Two curves in opposite directions : generally a convex dorsal one on the right and a lumbar convex on the left (fig. 607).

3rd degree. — Three curves exist : a principle and primitive one in the dorsal region, and two secondary, cervical and lumbar, called compensatory, in the opposite direction to the first (fig. 608).

The serious scoliosis of the third degree in the last stage presents veritable “lateral gibbosities”, or the back is bent, with a projection of the ribs forming the side of the classical melon and a contrary deformity of the front of the thorax. The back in these cases is nearly completely welded together and “incurable”.

The course to follow. — You can and ought to treat scoliosis of the first and second degree. In fact, you have chiefly to treat scoliosis of the first degree. In your ordinary practice you will see the children at this stage : if the parents do not shew the children unasked, you should make it a rule to see, every six months, for instance, the backs of all the young girls of the families of which you are the regular attendant, and if you treat the scoliosis at once, it will never reach the third degree.

If a neglected child is brought to you with a scoliosis of the third degree (fig. 608), do not attack it, it would be useless and you would reap only disappointment. The specialist alone can deal with it.

I. — TREATMENT OF SCOLIOSIS OF THE FIRST DEGREE

Amongst all the treatments proposed, which is good, and is there really a good one? That is the question. Where is the truth among the different opinions held?

We will hasten to tell you ; truth is certainly not in extreme opinions, in opinions exclusive and absolute. In this subject, we are eclectic, in therapeutics as in pathology.

Thus, it cannot always be said, as some would have it, that the essential scoliosis of adolescence is always, not even generally, really rachitic. What we will admit is that there very often exists, in scoliosis, troubles of nutrition presenting some analogy with those engendered by ordinary rickets. In children debilitated by enteritis, or by improper feeding, or by a faulty hygiene, or by a too rapid growth, or by previous illnesses, in the same way as in true rickets, the smallest

influence, the overloading¹, the bad sitting habit in school, repeated every day and several hours a day, are able to bring about scoliosis.

The treatment therefore will never be determined by an

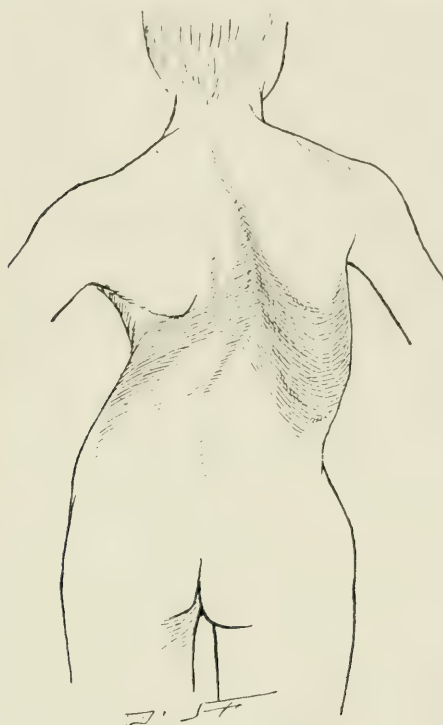


Fig. 6o8. — Scoliosis of the third degree (or rather at the time of changing from the second to the third degree).

absolute theory, exclusive, and, until thoroughly investigated, arbitrary. The treatment, general, anti-rachitic, reconstituant, would not be sufficient any more than the local or gymnastic treatment. — Our treatment should be at once general and local.

1. There are scolioses among the quadrupeds. Therefore the overloading, as the Germans understand it, is not necessary to produce scoliosis, and the predisposition distinctly exists in certain subjects.

THE GENERAL TREATMENT

This includes : A. The **feeding** of the child and supervision of its digestive functions; B. General **hygienic** measures.

A. In the matter of **feeding**¹, prescribe as for an ordinary rachitic, taking the age into account. Allow only foods which leave the minimum of residue, and counteract the intestinal fermentations by the local antiseptics you are in the habit of using.

With the same idea, deal with constipation. Order **massage of the abdomen** and support it with a girth made of several turns of broad Velpeau bandage.

B. From the point of view of **Hygienic** principles, you will advise the girl afflicted with scoliosis to live as much as possible in the open air. A **stay at the sea-side** would evidently be most beneficial, but it can be adopted only by a very small number of families.

Do not forget the usual **medicines**; cod liver oil, phosphates of lime, syrup of iodine and tannin, etc. But I need not insist on general treatment; that is a chapter which you know as well as I do.

A Word upon School and upon the Bed.

School. — Ought the child to go to school? You know the unfortunate effect of bad sitting in class.

Yes, if he is allowed long and frequent recreation, during which he has full liberty to enjoy the amusements suitable to his age, and if, during school hours, the school furniture at his disposal completely satisfies your orthopædic requirements.

Therefore no small straight tables, uniform for everybody, too high for the little, too low for the tall.

In the first case the child is obliged to hang on by his arms while he writes, pushing up the shoulder; and in the second, he bends himself, lying over his copy-book, his shoulders depressed.

This mischievous attitude, kept up for several hours a day, without being counterbalanced by anything, ends by persis-

1. *Scoliosis is a malady of the stomach* quite as much as it is a "school complaint".

ting in all the subjects who are ever so little predisposed.

It is for this reason that scoliosis truly merits the name of "school complaint". It is for the same reason, if the conditions of the school where our scoliotique goes are obviously bad, that it is necessary to withdraw him at least for some months.

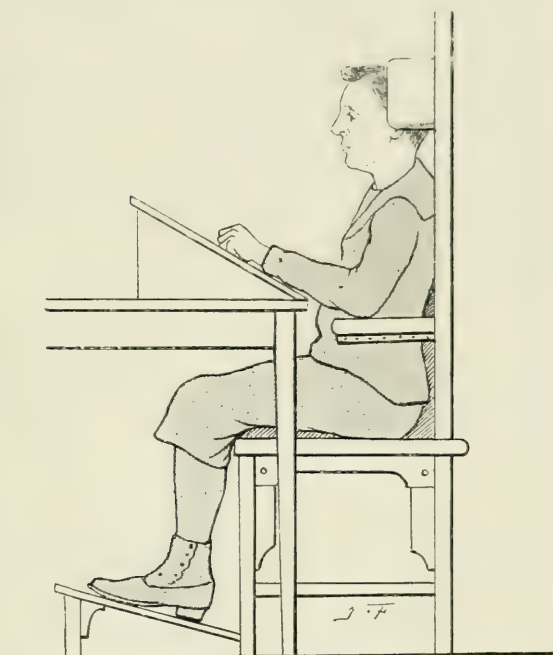


Fig. 609. — Our desk and chair for scoliotiques.

What the writing desk ought to be like. — You should order a seat with a very high back, where the head and the back will be constantly supported over as large an extent as possible, and a desk placed at a distance of from 20 to 25 centimetres away with an inclination of from 20° to 30° , so that the eyes can easily follow the characters drawn by the arm, supported by an elbow rest (the head and back remaining in contact with the back of the chair). The feet will be supported on a foot-stool, at a height which allows the thighs, in the horizontal

position, to be at the same height as the seat. This is (fig. 609) the school desk we should use. (Your carpenter can make it).

We will add that the child ought to become gradually accustomed to upright handwriting, which has not the numerous disadvantages of the slanting one (v. fig. 645, p. 601).

The Bed. — The child will lie on a flat hard bed (a plank under the mattress), without pillow or bolster.

The different hygienic principles, *good for all children, are indispensable to predisposed children*, that is, for candidates for scoliosis, either by heredity, or by the bad condition of their alimentary canal.

When scoliosis already exists, it is necessary to do all this as a matter of course; but it is till more necessary to follow the special treatment for the deformity — which is summed up in two words; gymnastics and corset.

THE LOCAL TREATMENT

Medical Gymnastics. — Exercises for Redressment.

Oh! do not be afraid, it is very simple. You need not have been born at Stockholm, nor assume an inspired look, to know that a curved arc is redressed by traction on its two extremities and by pressure made on its convexity.

True, in scolioses which have been left unattended, secondary curvatures are produced, and the really “corrective” manœuvres, whether they have much or little effect, have become very difficult to determine. But these scolioses concern the specialist. Do not undertake their treatment. It is only at the beginning that you will interfere. At the beginning, the curvature of the spine is single, and at this time the problem is reduced to redressing the arc. Not only will you **redress** it, but you may attempt to **inflect it in the direction opposite** to the deviation.

All manœuvres which lead to this result are good. You will easily find them by simple reasoning or by the modifications which the back of the child undergoes in the course of different movements which you tell him to perform, or which you yourself perform upon him.

So much for the *gymnastics special* to each case.

You will use besides, *general gymnastics*, the same for all, having for your objective : *a.* the **development of the thoracic cage**, by forced inspirations, followed by complete expirations; *b.* the **exercising of the muscles of the back and limbs**, by symmetrical movements of the arms, the legs, which all school children know how to make (one, two!...); the flexing of the body forwards, backwards, marching to the word of command, dumb bells, etc.

But you may be scarcely content with these summary indications. To be really useful to you we must be precise and codify, so to speak, all the exercises. Here is a programme, easy to follow, which we have drawn out for you with our able assistant and friend Roederer. It has this advantage that you **can make use of it without special outfit** and without rigging, in the most modest families.



Fig. 610.

It is inspired by two principles which ought to be the two directing ideas of the whole treatment of scoliosis :

1st. **To strengthen the organism.**

2nd. **To correct the deformity.**

It requires two sittings a day, at nine in the morning and at five o'clock in the afternoon, for instance. Each séance should last from three quarters of an hour to one hour.

You will yourself preside at the first exercises; then, after the third or fourth sitting, when you have educated **the mother** as well as the child, she **will be able to replace you satisfactorily.**

You will only have to see the child again once a week, or even less often. We remind you that this refers to scoliosis of the first degree. The example chosen (fig. 610 and following) is that of a boy¹ of twelve years of age, of feeble constitution, who goes to school; slight right scoliosis, right shoulder higher than the other.



Fig. 611.

The gymnastic and redressing exercises comprise **four parts**. The first and fourth are general gymnastics, useful and applicable to all children; the exercises of the second and third parts are the special treatment for the deformity.

1st PART. — Respiratory Gymnastics. — Duration : 7 to 10 minutes.

Upright, — **1st.** Make a deep inspiration through the nose,

1. Although less frequent than in girls, essential scoliosis is far from being rare in boys.

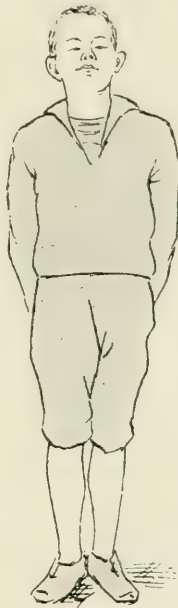
followed by an expiration as complete as possible by the mouth.

2nd. Starting position. — Elbows bent and horizontal, hands level with shoulders (fig. 610).

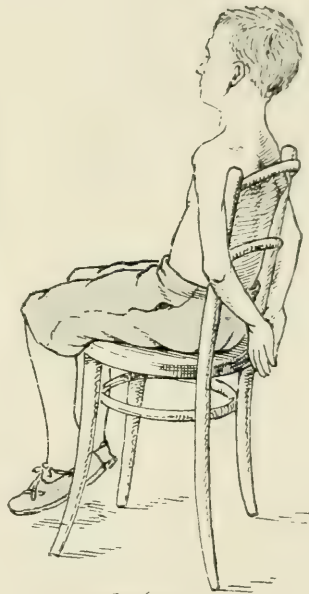
Extend the arms in the form of a cross during inspiration



W. J. F.
Fig. 612.



W. J. F.
Fig. 613.



W. J. F.
Fig. 614

(fig. 611). Return to the starting position during expiration.

3rd. Starting position. — The arms hanging by the sides. — Raise the arms laterally, first cross-wise, then above the head (during inspiration), remaining so for three or four seconds (fig. 612).

Let the arms fall, as far behind as possible, during expiration (fig. 613).

Recommence the series (1st., 2nd., 3rd.) for three or four minutes. Afterwards, rest a minute.

Seated. — 1st. The same exercise as that performed just



Fig. 615.

now upright (N° 1), the hands being clasped at the level of the pelvis, behind the chair (fig. 614).

2nd. An assistant passes his hands under the child's axillae and raises the thorax at the end of the inspiration, which is thus "forced" (fig. 615).

Recommence the 1st. and 2nd., for three or four minutes.

As a general rule, **children do not know how to distend the thoracic cage without special instruction.**

The respiratory co-efficient, that is, the difference of the perimeter in inspiration and expiration, is barely one or two centimetres at the beginning of the treatment.

After two months of these lessons and exercises, the co-efficient rises to 4, 5 or 9 centimetres.

Draw the attention of the parents to this; that is, make them measure the perimeter of the thorax at its maximum amplitude, in forced inspiration, first at the beginning of the treatment, and then at the end of the first or second month; the comparison will surprise and stimulate them. It is certain that a larger ventilation of the lungs, determining a more complete oxygenation of the blood is, for the child, a condition which improves its general health.

Indeed, **after a few weeks** of these lessons, all children not only **hold themselves better** but **are better**. It is manifest to everybody, and is to the parents a great encouragement. This is not immaterial, because it necessitates much perseverance on the part of every one, for many months, to arrive at a definite result.

For the rest, the practice of these respiratory exercises is becoming generalised. They will soon be, if they are not already, part of the daily programme of all the schools, ranking with, and of more utility than, the lessons in astronomy, anatomy, chemistry or physics.

But besides these eight or ten minutes devoted specially to respiratory movements, it is necessary that the child profit by the lesson in a continuous way. For all the *remainder of the gymnastic exercises* he ought to breathe deeply, taking care that for each exercise, the end of respiration coincides with the maximum of effort, and that, *during the whole day* he should remember to make several forced respirations every hour, which will insensibly lead to a better respiration at ordinary times, even when he is not thinking of it.

After the 8 to 10 minutes devoted to the respiratory movements a *rest of five minutes*, in the recumbent position, on the floor; then one passes to the second part of the lesson.

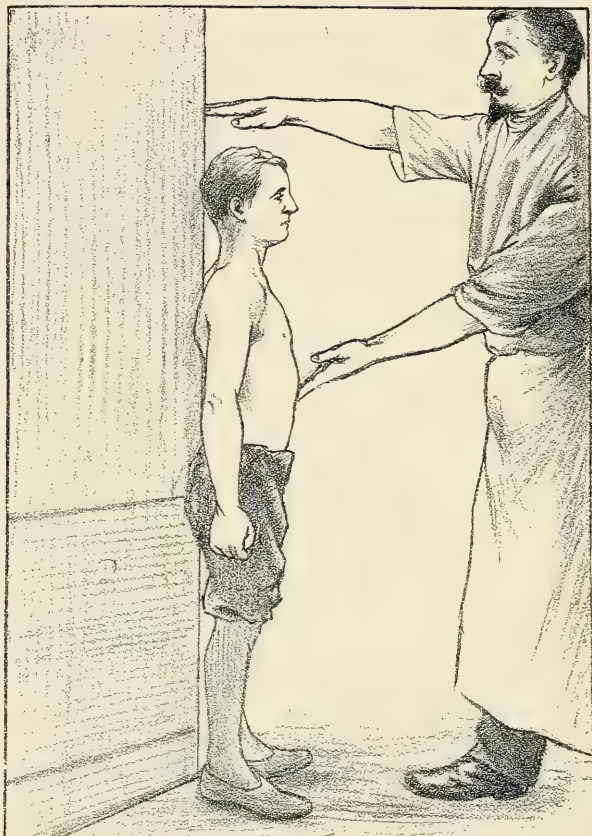


Fig. 616.

2nd PART. — Active exercises, made by the child alone under your direction.

A. AUTO-REDRESSMENT. — 1st Exercise. — The child, his arms hanging downwards, his back supported at the angle of a door, tries to make himself taller, without raising himself on

his toes, raising his shoulders, or lifting up his chin (fig. 616) as one instinctively stretches oneself under the standard to push the slide with the head. He is able in this way to increase his height by 1, 2, 3 centimetres, from the beginning of the exercise.

2nd. To obtain still more by this exercise, he places his hands upon his hips (thumbs behind) using them as a support and raises himself on his arms, always without raising the shoulders (fig. 617).



Fig. 617.



Fig. 618.



Fig. 619.

After having repeated these exercises for six minutes, he rests for two minutes, and passes on to the following.

B. CORRECTION. — This exercise lasts from four to five minutes.

1st. The child, arms down, inclines himself to the right,

on the side of the convexity, the shoulders remaining in the same plane transverse vertical, or frontal (fig. 618).

By this movement, the right curvature will be placed in a state of hyper-correction, and you will even see a curvature



Fig. 620.

produced on the left side. — There will be, as it were, a scoliosis in the opposite direction.

2nd. The child holds his left arm (of the concave side) straightened vertically, he stretches himself as far as he can



Fig. 621.

(fig. 619) whilst with his right arm semi-flexed, he pushes forcibly the right convex side from behind forwards and from without inwards. He repeats Nos 1 and 2 for four minutes.

After that, five minutes pause as above. Then, we pass on to the third part of the exercise.

3rd. PART. — **Passive Exercises.** Here, it is we (and later

the mother) who straighten the deviation. The child submits passively to correction.

1st. The child is laid on the right side, that is, on the convex side : a pillow is doubled up and placed between the floor and the child (duration, two minutes : fig. 620).



Fig. 622. — Scoliosis with convexity to the right (single curvature). The child being suspended on the horizontal bar, one carries the pelvis to the right.



Fig. 623.

2nd. You join your hands under the convexity and raise the child from ten to fifteen centimetres above the folded pillow. Repeat this from six to eight times a minute (fig. 621).

3rd. The child is hung up by the hands to a bar fixed in a doorway : the feet off the ground, you take him by the pelvis which you displace towards the right (convex side) from 30 to 50 centimetres. The right curvature will be corrected. Repeat this five times, taking, after each movement, a few seconds rest (fig. 622). Afterwards, *five minutes pause as above*.

4th. PART. — You will complete the practice by some **general Exercises**, symmetrical, regular and **slow**.

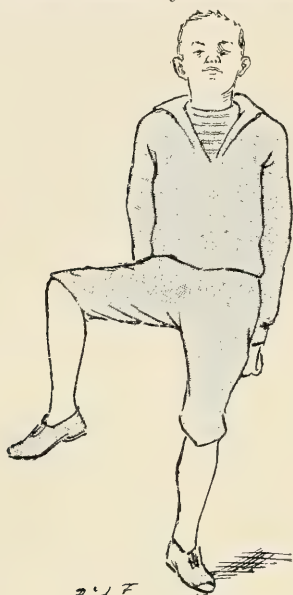


Fig. 627.



Fig. 628

Standing Upright. — 1st. Elevation of the arms in all directions, in two or four stages (fig. 623).



Fig. 629.

Remember that the movements of forced inspiration ought to coincide with the elevation of the arms, and the movements of expiration with their depression.

2nd. Movements of lateral inclination, of flexion forwards, of rotation of the head in two stages.

3rd. Flexion of the thighs (fig. 627 and 628). Repeat n^{os} 1, 2 and 3 for two or three minutes.

Lying Down. — 1st. The arms are carried outwards, then above the head, without leaving the floor, then returning to their first position (fig. 629).



Fig. 630.

2nd. The lower limbs are widely separated, then approximated.

3rd. The legs are flexed on the thighs, the thighs on the pelvis, the pelvis on the thorax (fig. 630).



Fig. 631.

Then repeat n^{os} 1, 2 and 3 for one or two minutes.

Laid on the face. — Raise the trunk, make swimming movements. Some one supports the feet, at the beginning (one minute) (fig. 631).

Massage of the Back. Before leaving the child, you perform a massage of the back; first, skimming over from the head downwards; then firm frictions with the palm of the hand, from below upwards; afterwards **vibrations** with the index and second fingers together, on both sides of the spinous processes, one hand on the right, the other on the left.

Scoliosis is an arc of a circle. On the concave side, all the tissues, muscles, tendons, ligaments, aponeuroses, are contracted. Therefore, on the concave side fatigue, knead, extend, elongate the muscles as you would do for the contracted adductor in coxitis.

On the other side, on the contrary, the muscles are feeble, ill nourished: one must strengthen, treat them gently, improve their nutrition. Reserve for these muscles a slight massage, slow and rather prolonged (10 minutes), causing the lymph and the blood to circulate, hastening, by an incessant return of new blood and a vigorous circulation, the nutritive and respiratory exchanges.

The application of **electricity** in the form of constant and faradic currents, will render you very great service in hastening the regeneration of the muscles and increasing their force¹.

This is what you can do and know how to do wherever you

1. **Electrification** of the muscles of the back, in scoliosis, is performed at a **seance** composed of **two parts**: the **first** devoted to the **galvanisation** of the muscles of the **convex** side whose increase of vitality is necessary; two large electrodes are placed one at the nape of the neck, the other at the loins; the positive pole is at the nape of the neck. The current is turned on and gradually increased up to 15 milliamperes: it is applied for 10 minutes.

The **second part** is devoted to the **rhythmic faradisation** (Bergonié) of the different muscles of the back. It is of advantage to electrify the muscles of **both sides**. Faradisation is made by means of induced currents obtained from a coil with a large thread. The necessary interruptions to excite the successive contractions of the muscles are determined by the operator with his finger, or better by a metronome interruptor introduced into the circuit (the apparatus is regulated so as to obtain medium contractions with an interval of a second's rest). The second part of the seance should last about a quarter of an hour (Dr Bergugnat, d'Argeles-Gazost). — The electrical seances should be repeated three times a week for two months, after which one discontinues them for six or eight weeks. — For installation of the apparatus, see page 661.

are : something which a devoted and intelligent mother will do when she has once seen it done.

In the afternoon a second seance of gymnastics and redressment, in every way the same as that of the morning.

In the interval, three or four times a day, a quarter of an hour's walk. No violent games, no cycling, no fencing, no swimming.

Between times, at meals, for instance, and to learn his

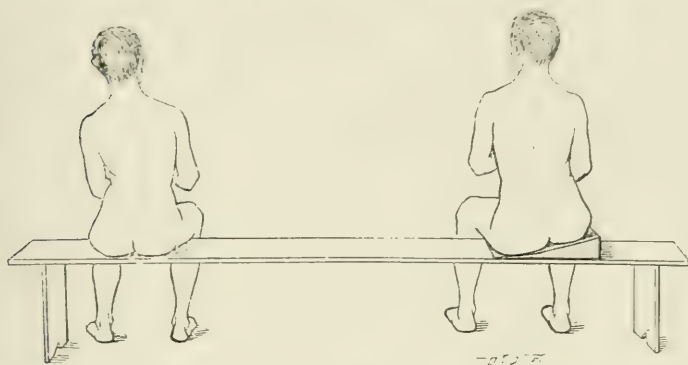


Fig. 632. — Special form : to the left of the reader the scoliotic child is badly seated : on the right, the seat is oblique, raised on the convex side : the child, to keep his equilibrium, straightens himself instinctively.

lessons, the child should be seated on an inclined seat as shewn here (fig. 632).

As to school, as I said before, if the child is to attend it, the special desk is necessary (fig. 609), two hours **class** in the morning, with a quarter of an hour for recreation, and two hours **class** in the evening, are **permitted**.

Finally, it is well to ensure for the child an hour or an hour and a half of rest, now on the back, quite flat, then laid on his side, with a folded pillow interposed between the floor and the convexity.

We have already mentioned his sleeping at night on a flat bed.

THE CORSET IN SCOLIOSIS

Is it necessary to wear an orthopædic corset?

I warn you that every family, or nearly every family, cavil with

you as to the utility of a corset in this first stage of scoliosis, where, say the parents, there "is absolutely nothing".

It is true that the corset may not be indispensable at this moment, for a child who is almost always reclining.

We cannot reasonably insist on this at the beginning; it would be too harsh a proceeding to remove the child from the ordinary life of children of his own age. The family would not be agreeable to it and it would not be agreeable to ourselves were we dealing with our own children. We will therefore allow the child to continue his studies and at the same time give him liberty to come and go to the seances of exercises and massage. But to allow this liberty to walk and remain upright for several hours a day is not without inconvenience; it is well to support the vertebral column with a corset. I do not say that the disease will never be cured without a corset, in scoliosis in its earliest atage: nevertheless, even in mild cases, there will be **a much better chance of a good and rapid cure with a corset than without it.**

To judge of the expediency of a supporting corset, think of club-foot. If, after having redressed it by manipulations two or three times a day, the patient is made to walk without a support, what will become of him? Not only will there be no correction, but, as a general rule, the condition will become aggravated, and one is obliged to support the foot in the intervals of the exercises. Well, the situation is just the same here.

Therefore, bear in mind that the manœuvres and exercises of redressment in scoliosis are not carried out in many families more than once every two or three days. If, from one seance to the next, the spine is not well supported, the scoliosis will easily become aggravated.

But it is not sufficient "to put" on a corset, it is necessary that it serve its purpose well. **In practice, nearly all the corsets are defective;** they do not support and they prevent nothing or next to nothing; and the back, instead of being eased, is made to carry increased weights; it is a burden which, added to the already too great pressure of the head and shoulders, only accentuates the deviation instead of attenuating it.

Look at the corsets generally used: whether intended for a scoliosis situated high or low, the corset invariably stops at the axilla, often manifestly leaving the deviation outside the upper edge of the corset. On the other hand, the corset does not descend low enough, it terminates at the iliac crests. So that, if one could see through the corsets in common use (you could try to do so: make a dorsal opening, to convince yourself of what I say) one would see the deviation as it is under the corset, sometimes even accen-

tuated by the weight of the apparatus.

How is this difficulty to be solved?

The best method of supporting the spine would be, you anticipate it, a moveable plaster corset, similar to that used in Pott's disease, see Chap. v, a medium plaster or a plaster according to the situation of the scoliosis. It should be constructed in a position of correction of the scoliotic spine, with an opening in the back in order to be able to exercise direct and precise pressure on the convexity.

And this is the kind of apparatus we advise you to make for hospital children, where arrangements do not permit of the seances of gymnastics and redressment.

But there is something better for private cases which you (or the parents) can shape, exercise and redress once or twice a day.

For them, in order to meet every requirement, namely the support of the back and the possibility of making the daily exercises, it is necessary to apply a **moveable corset** in leather or celluloid, which is at once **lighter** and **firmer** (fig. 633 and 634).

You take a mould in very slight extension of the spine (the feet resting on the ground by the whole of the sole) and on this mould you construct, or cause to be constructed by the orthopædist, a celluloid apparatus.

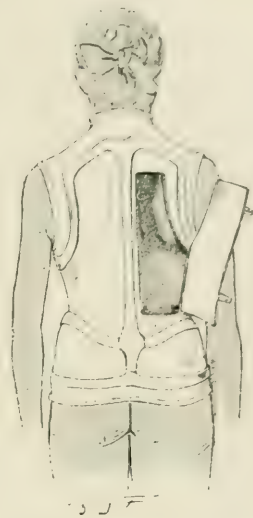


Fig. 633. — Corset with an opening to compress the convex side.

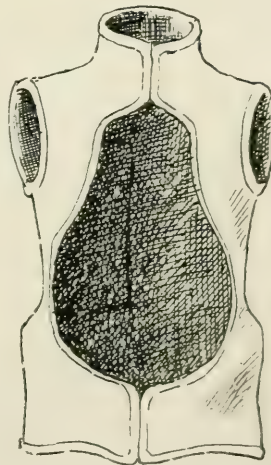


Fig. 634. — The same, front view.

We have described, on p. 97, the method of making a mould of the trunk and an apparatus in celluloid, as well as the technique of dorsal compression.

Ought the corset to be worn always?

In theory, it would be excellent to keep it on constantly, omitting it, of course, at the seances for redressment.

As a matter of fact, it would be better, in order to spare the muscles, for the parents to remove it at night and also, if practicable, during the hours of rest (in the recumbent position) taken during the day time.

II. — SCOLIOSIS OF THE SECOND DEGREE

If a more advanced scoliosis is brought to you, with already two curvatures (for instance, a dorsal convexity to the right and a lumbar convexity to the left, that is, *a scoliosis of the second degree*, v. fig. 607), you can and you ought to treat it. With a treatment longer and more severe, you will not only stop the actual deviation, but even obliterate it almost completely.

Nevertheless, do not be positive in such a case, for a perfect result is not certain, in a patient who has come to you rather late.

GENERAL TREATMENT

You will prescribe the same dietary, the same hygiene, the same respiratory exercises and general gymnastics as for a case in the first degree, but the manner of life of the child will not be exactly that described above.

Several things which were permitted in early scoliosis should be proscribed in this stage.

In order to carry out a consistent treatment, it is necessary to withdraw children from school for at least a year. Piano playing must be discontinued and, it goes without saying, horse riding, cycling, as well as violent games and long walks are forbidden.

The girl, withdrawn from school, would however be able to continue her studies, either sitting on a special form or, still better, lying on the face or the back.

She must rest, at any rate, for $\frac{1}{4}$ or $\frac{1}{2}$ hours every day, in the recumbent position.

One cannot, generally, condemn her to continual recumbency, as some would have it. It would be too great an upset in the mode of life of the child, as well as that of her friends. Her general health would suffer, unless she lived by the sea, which is not possible for all, or at least for the majority of children.

Therefore you will permit some amount of walking: 3 or 4 times a day, for a quarter of an hour or twenty minutes at a time. These moderate walks will have the effect of preserving the general health of the muscular system.

LOCAL TREATMENT

A. — The Corset.

There is no possible hesitation about using a corset here; it is always necessary. It should be a celluloid corset, with two openings opposite the summits of the two curvatures, to effect the two compressions in opposite directions (fig. 635).

During the day it is only removed for redressing exercises and for the hours of rest on the back. It remains, moreover, in place at night (at least one night out of three, to effect part of the correction without fatiguing the muscles too much).

B. — We come now to the **redressing exercises** to be made in scoliosis of the second degree.

1°. AUTO-REDRESSMENT.

a. Begin with the redressing exercise advised for the first degree (v. fig. 616).

CAUTION. — In dispensable orthopedics,



Fig. 635. — Corset with two openings, one over the dorsal convexity, the other over the lumbar convexity, allowing of compression being made as with the corset shown in fig. 642, p. 597.

b. The same, the hands on the hips (fig. 617).

c. Advise also the attitude of fig. 637.

The child, upright on a stool, stands on the left leg, the



Fig. 636.



Fig. 637.

right leg hanging over outside. The lumbar curvature is redressed (fig. 636).

He raises his left arm on the side of the dorsal concavity.



Fig. 638.

The dorsal curvature is corrected (fig. 637).

He pushes with the right hand over the right concavity. The dorsal curvature is hyper-corrected.

2nd. ACTIVE EXERCISES OF CORRECTION. — *a*. The same exercise of lateral flexion as in fig. 618, the left foot resting on the foot stool.

b. The legs in the same position, the child draws up his left arm, as in fig. 619.

3^d. PASSIVE EXERCISES. — *a*. The child is laid on his right side. — The dorsal convexity is raised up and corrected by a folded pillow, just as in fig. 620.

b. The child is lifted up by that part of the body opposite the dorsal convexity as before (fig. 621). But, besides that, you pull on the right leg, on the side of the lumbar concavity, and that redresses the concavity.

c. The child is laid on his left side, and the left arm (on the side



Fig. 639.

of the dorsal concavity) stretched as much as possible; you pull on the right leg, on the side of the lumbar concavity, and this manœuvre (fig. 622) redresses both the curvatures.

d. The child holds by his hands upon a bar fixed between two door-posts, but the bar is inclined in such a way that the right

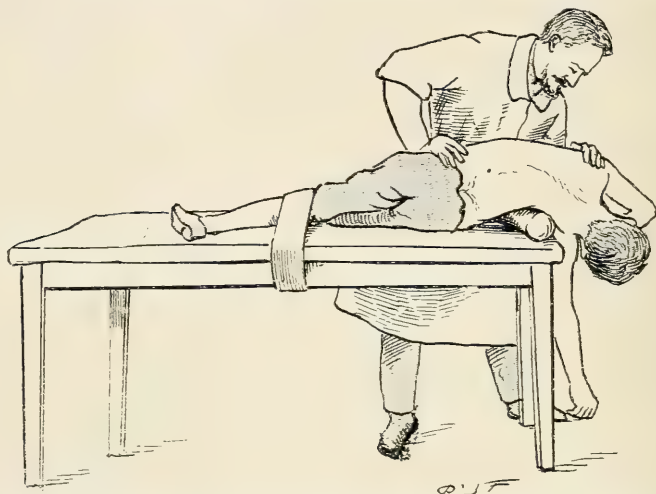


Fig. 640. — Redressment of a scoliosis : the child is laid on his side, a pillow placed under the convexity : the surgeon presses upon the pelvis and upon the shoulder to redress the vertebral column.

hand (on the side of the dorsal convexity) is lower than the left (fig. 639).

Then the legs are carried to the left and the pelvis is brought down a little to the right.

e. The child will often place himself, during the day, in the recumbent position, on the left side, and will perform flexions of the right leg.

Forced redressment and treatment by the plaster.

Can anything more be done for these scolioses of the second degree? For instance, can we seek for a more accentuated passive redressment, and maintain the result obtained with an irremovable plaster?

Yes, without doubt, but for a very limited time and only after having well mobilised the vertebral articulations and strengthened

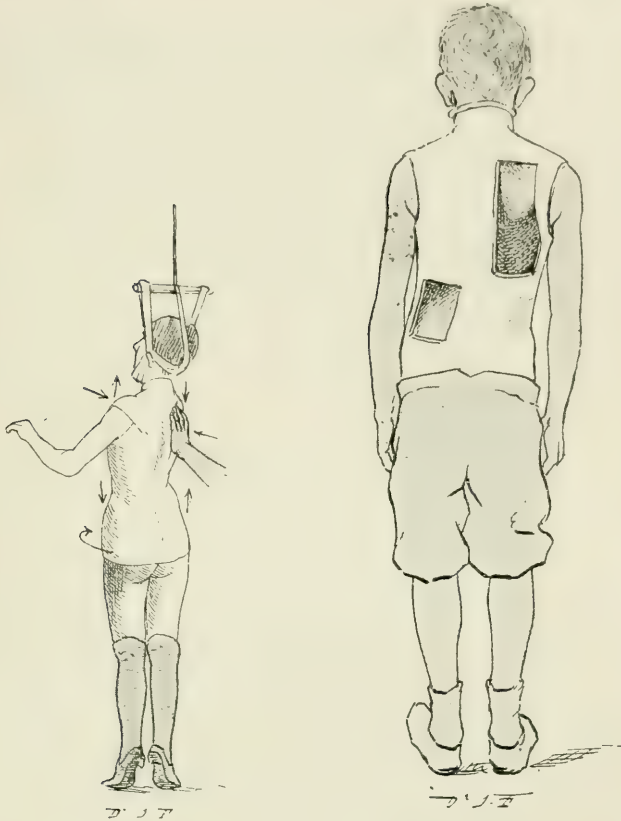


Fig. 641.

Fig. 642.

Fig. 641. — Scoliosis with convexity to the right. Dessiccation of the plaster. One pushes the right shoulder forward and the left backwards. One pushes backwards and upwards the right hip. One pushes forwards and downwards the left hip.
 Fig. 642. — The apparatus completed and furnished with two openings opposite the two convexities (right dorsal and left lumbar).

the muscles of the back by the treatment we have just described, continued for six months, for example.

Then you may make a more accentuated passive redressment

of five or ten minutes, the patient laid on his side — by manœuvres analogous to those which one would make for redressing

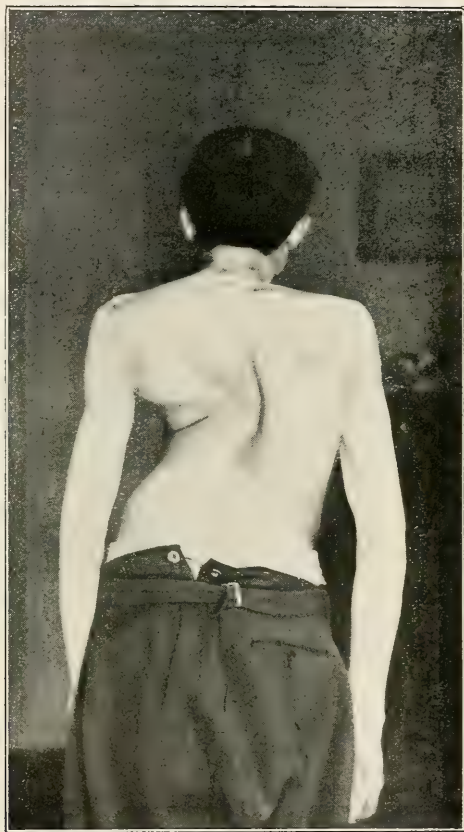


Fig. 643. — A case of forced redressment. Scoliosis of the third degree, of eight years standing. Albert G., of Paris, 19 years and a half. Condition on arrival at Berck in 1903. Height 1.57 metre. The following figure shows the result.

any deviation whatever, a club foot, for example, and going as far as hyper-correction (fig. 640).

Immediately this is reached, one applies, in the upright position a very accurate medium plaster (fig. 641 and 642), with

dorsal and lateral openings (see, for the construction of the corset, p. 289). The plaster will be kept on for several months.



Fig. 644. — The same six years later. Height 1.66 metres. The treatment had lasted two and a half years and consisted in the application of a new large plaster every 3 or 4 months; he had seven plaster apparatus, of which the two first were applied under chloroform.

about three or four, after which one removes it to repeat the ordinary treatment with gymnastics and a removable corset in celluloid made on a new mould. This method economises the

muscles of the back much more than that which consists in carrying out the whole of the treatment with a plaster.

Nevertheless, this last treatment is the one you would be obliged to apply to hospital children and to those of the working class, to whom the daily treatment by gymnastics is not possible.

True! the complete treatment of scoliosis by plaster will generally give the best immediate results; but the muscles having been enfeebled by the pressure of the plaster and the want of exercise and massage, the result is often lost, in part, after the removal of the plaster apparatus.

So that, in private cases, it is necessary to try to make the redressment of the osteo-articular trunk at the same time that you preserve the muscles. That is what you will succeed in doing by the mixed system, gymnastics and celluloid corsets, as we have described it.

SCOLIOSIS OF THE THIRD DEGREE

We have defined this at the beginning of the chapter. There can be no question of classes or studies to be kept up by the children; they are patients whose treatment should be as continuous and strict *as that of Pott's disease*.

They should live by the sea if possible.

After having mobilised the more or less ankylosed vertebral articulation by gymnastic treatment kept up for several months, one will submit them every three months to séances of forced redressment, 15 or 20 minutes at a time, under chloroform, followed by the application of a large plaster with dorsal openings for the compression of the projecting parts¹. Rest for one or two years in the recumbent position (fig. 643-644). Our ambition is limited, here, to fixing the back in a better position, without immediately concerning ourselves with the muscles.

This treatment is very difficult and very thankless, *on account of the excessive torsion of the vertebræ* in such cases, a torsion against which we are very badly armed, in spite of, all the

1. Vide Calot, *De la correction des Scolioses graves* (Masson).

" detorsion apparatus " which have been invented up to now.

But, as I have said, the treatment is exclusively reserved for specialists, and I do not insist.

RESUMÉ OF THE TREATMENT OF SCOLIOSIS

This is what you will prescribe for the young scoliotic girl who has come to you *at the beginning of the disease*.

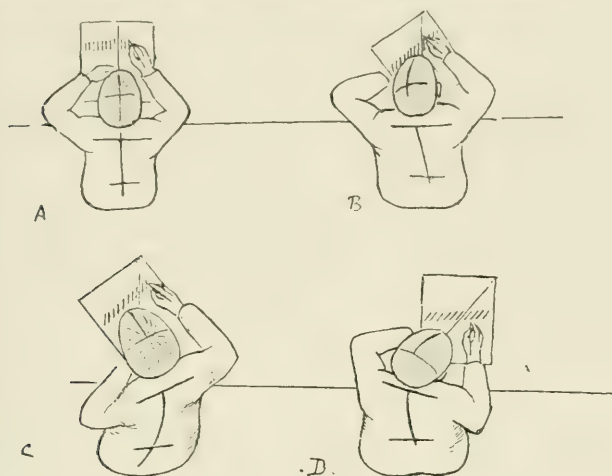


Fig. 645. — A. The handwriting straight (characters straight) leaves the spine straight.

B., C., D. All the other handwritings carry with them the vicious attitudes of the spine (lateral inclination and torsion).

(Copied from Ritzmann and W. Schulthess, of Zurich.)

Should there be adenoids, troubles of vision, deformity of the lower limbs, they must be attended to.

1st. General Treatment.

a. Dietary sound and simple, supervision of the digestive functions, massage of the abdomen.

b. General Hygiene : life in the open air of the country and of the sea-side, salt baths, good conditions of climate and of dwelling, as a matter of course.

2nd. Local Treatment.

- a. Ensure a good attitude in class (v. fig. 645).
- b. General and special gymnastics : $\frac{3}{4}$ of an hour morning and evening (active redressment, passive redressment). Instruct the mother how to carry out the exercises.
- c. Massage and electrification of the muscles of the back.
- d. A fenestrated corset and compression, except in scoliosis almost imperceptible at the beginning.

It is sufficient, after having "started the treatment", to see the child once or twice a month, in order to control it, and to take a mould once a year in order to replace the corset.

If you treat commencing scoliosis in this way, in your clientele, I do not say that there will be no more severe cases¹, but I affirm that they will be a hundred times less frequent as is the case in Sweden, where they are practically never to be seen.

The Duration of Treatment of a Recent Scoliosis.

You will carry out the treatment we have described, as long as the scoliosis continues, that is, **for a year or two**, as a **general rule, for scoliosis of the first degree** — those you are called upon to attend.

After that, your active part will practically come to an end : you will be able either to discontinue the treatment, or reduce it by half, leaving the parents or the children to continue it themselves to the extent you judge to be necessary. They will do so without difficulty. Nevertheless, you will have to look after these young girls for several years and even up to the end of their development, stopping the active treatment and returning to it, according to the needs and indications of each particular case.

1. Because there may exist, as we have said, some very rare malignant scolioses, which may become aggravated *in spite of everything*, in the same way as certain malignant external tuberculoses. But it is the greatest exception for the one as for the other; it does not happen more than once in a hundred times. I am speaking always of the essential scoliosis of adolescence, and not of scolioses distinctly and frankly rachitic, existing from the earliest infancy, the prognosis of which is much more serious (v. p. 639).

CHAPTER IX

ROUND BACK. — LORDOSIS

Besides the lateral deviations we must mention the *median* deviations (non-tuberculous) which form :

Either the *round back*, *kyphosis*, that is, a posterior convexity (fig. 646) :

Or, on the contrary, a *saddle shaped hollow*, a *lordosis*, that is, a deviation with a posterior concavity (fig. 647) :

Very often the round back and lordosis exist together. The patient presents a *dorsal kyphosis* at the level of the shoulder blades and a *lumbar lordosis* which is simply an exaggeration of the physiological curvature of the loins.

Kyphosis (round back) and *lordosis* may exist without any other deviation : but they may also be added to a lateral scoliotic deviation.

One may even say that, generally, scoliosis accompanies a deviation slightly or strongly marked in the antero-posterior direction (kyphosis or lordosis), or even a flat back.

Therefore always remember to carefully examine the spine and look for a scoliosis, when you are consulted as to a round back, just as a suspicious lumbar hollow invites you naturally to examine the gait and condition of the hip and to think of a congenital luxation or a coxitis.

The same treatment and the same exercises are suitable for kyphosis and lordosis, whether they exist alone or are associated with a scoliosis.



Fig. 646.

Kyphosis or Round Back.**A. Respiratory Exercises.**

Starting position. — The child's arms are extended and brought together in front, the hands being in contact.



Fig. 647.

The child then takes a deep inspiration, opening the arms at the same time. An assistant makes resistance to the movement of separation of the arms — a gentle, equal and sustained resistance.

This exercise develops the muscles which approximate the scapulae to the vertebral column.



Fig. 648.

B. *Active Exercises.* — 1st. The child extends the head backwards, at the same time that he curves the loins.

2nd. Standing upright, against the edge of a door, he carries his elbows as far backward as he is able (fig. 648).

C. *Passive Exercises.* — The child is placed against a ladder, suspended by the arms. A cushion is placed behind the shoulders, opposite the deviation (fig. 649).

In school, the child, as often as possible, keeps his arms crossed behind the back of his chair.

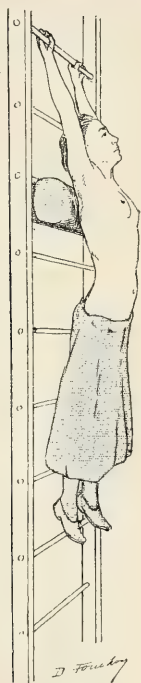


Fig. 649.

Fig. 649. — Round Back. The child hangs upon an upright ladder with a cushion beneath her shoulders.

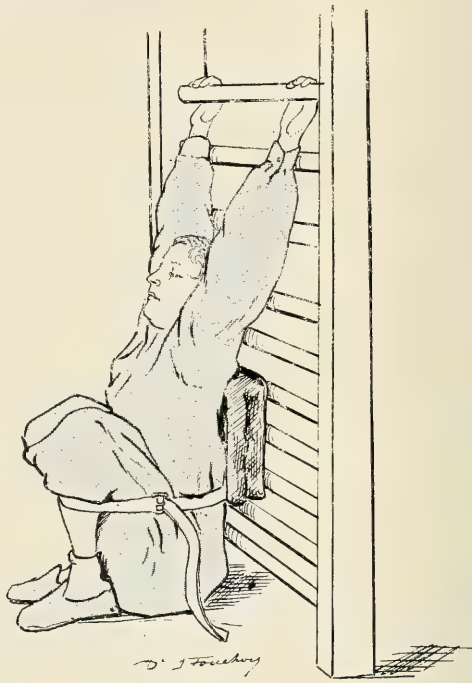


Fig. 650.

Fig. 650. — The child is seated at the foot of a straight ladder, the arms are raised, the thighs in forced flexion, the knees flexed on the thighs and kept so by a strap.

Sometimes the wearing of braces, which draw the shoulders backwards may be recommended on the condition that they do not impede the respiratory movements.

The other points of treatment of essential kyphosis, diet, hygiene, school hours, walking and promenading, recum-

bency, etc., are the same as for scoliosis of the first degree (v. p. 572).

The corset. — In preference to the braces mentioned above, the child will wear, except during the night, and, of course, at the time of the gymnastic exercises, a celluloid corset with **a median dorsal opening** to allow of **compression by cotton wool** which will help the correction of the kyphosis.

We have completely cured, by plaster or celluloid corsets alone, and without other treatment, a great number of round backs and lordoses (with, it is true, the precious adjuvant of sojourn by the sea). But the best is to combine the two therapeutic factors ; gymnastics and the corset.

Lordosis.

Active Exercises (v. fig. 648).

Passive Exercises.

Correction of the lumbar hollow by the recumbent position face downwards, with weights on the buttocks and the back.

Note also the good effects of extension of the spine by suspension, or rather simple tension (v. fig. 243 and 244); repeat such tension of the spine three times a day, five minutes each time.

The corset is the same as that for kyphosis : by pressing on the dorsal region through an opening there, one lessens much the “ hollow ” of the lumbar lordosis.

CHAPTER X

RICKETS

We concern ourselves with Rickets from the orthopædic point of view only.

Rickets deform particularly the lower limbs and the back.

I. — DEFORMITIES OF THE LOWER LIMBS

They are, in order of frequency :

- a. Deformities of the knee and, in particular, genu valgum; much more rarely, genu varum;
- b. *Curvature of the tibiæ;*
- c. *Curvature of the femur and coxa vara.*

A. — GENU VALGUM

A little child of from 2 to 4 years of age is brought to you with a knee, or more often both knees turned inwards, what are you going to do?

You will adopt a general treatment and a local treatment.

The general treatment of Rickets as you know quite well is :

Medical : Cod liver oil, phosphorus, etc., with the discreet use of intestinal antiseptics;

Dietetic : milk and eggs constitute the basis of the feeding.

Hygienic and Climatic ; living in a house and in a climate which is dry and sunny and, if possible, at the sea-side, which works marvels in such cases, and cures the children with a minimum of local treatment.

Local Treatment.

The first thing is to prevent walking, if you can induce the parents to see to this; rest in the sitting position, the legs horizontal (for some months, from 6 to 10 months, or thereabouts).

At the sea-side, rest suffices to bring about the redressment of nearly all the rachitic deformities not far advanced.

At Berck, for example, it has been so, in more than three quarters of the cases which have come to us. After a stay of from 6 to 15 months, the knees have become straight and strong spontaneously. One can then let the children get about; they are cured and remain cured, without ever having worn an apparatus.

But matters do not go so simply with children who live under conditions less favourable, for example, in a large town, nor even in those who live at the sea-side, when the genu valgum is very marked, as in the case, figured here, of three brothers, attacked at the same time with serious rickets (fig. 657 and 658).

Therefore, in a poor neighbourhood and in severe forms, you would be wrong in discounting the cure by rest only; begin active treatment, without loss of time.

On the other hand, if the parents do not agree to allow the child to rest, the use of an apparatus after correction is necessary, even in mild cases.

There are **two ways** of effecting **correction**, or rather two methods to remember, although the classical books point out several dozens.

The first, the ordinary and most simple way, is to redress by dealing with the joint : a **bloodless** procedure.

The second is that of operating upon the lower part of the femur by means of the **osteotomy** of Mac Ewen.

Both methods are good, how are you to make your choice?

It is first of all an affair of temperament on the part of the surgeon.

If, instinctively, you prefer not to use the bistoury, or still more, if the friends recoil at the idea of an osteotomy, remember that you can always arrive at a cure by orthopædic

manœuvres, by accomodating yourself to circumstances in the most difficult cases, to the making of two or three seances and as many apparatus, and devoting three or four months to the treatment, which puts you after all to very slight inconvenience.

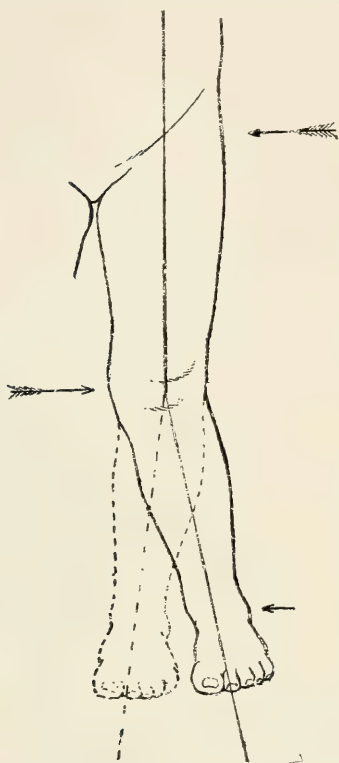


Fig. 651. — Schema of the redressment of genu valgum.

On the contrary, if you are a surgeon, and consequently osteotomy is an operation familiar to you, you will willingly perform it, which is quite easy and will give you the desired result with a single apparatus and two months of treatment.

On principle, in spite of the good results of osteotomy, I advise you always to **prefer an orthopædic redressment**, because the treatment is **more simple** and **more practicable** for you.

Need I add that, for other reasons, the purely orthopædic treatment appears to me more rational than the surgical, here as in other deformities, club-foot, congenital luxation, etc.

Remain faithful to these principles. So far as I am concerned, I used often very willingly to perform the classical supra-condylar osteotomy, or even manual osteo-clasis; I adhere now-a-days to a simple articular redressment. I proceed in the following manner :

1st. METHOD. — SIMPLE REDRESSMENT

a. The case of slightly marked genu valgum.

Be the joint relaxed or not, you will accomplish, by gentle

progressive manœuvres, of three, four or five minutes, a redress

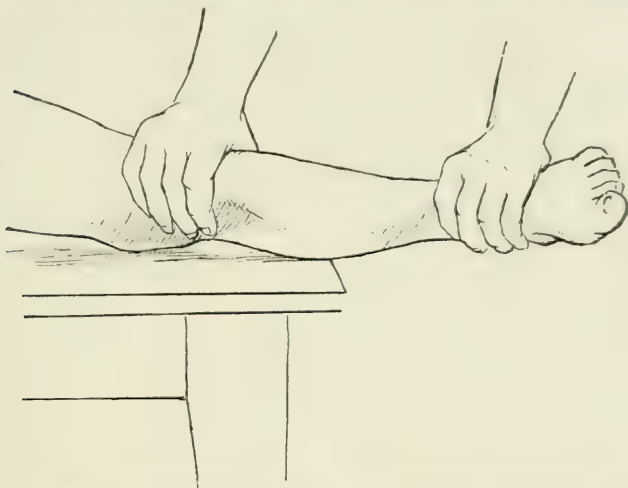


Fig. 652. — The foot is pushed inwards, and the knee is drawn outwards (see preceding figure).

ment more than sufficient for the knee. When the result hat

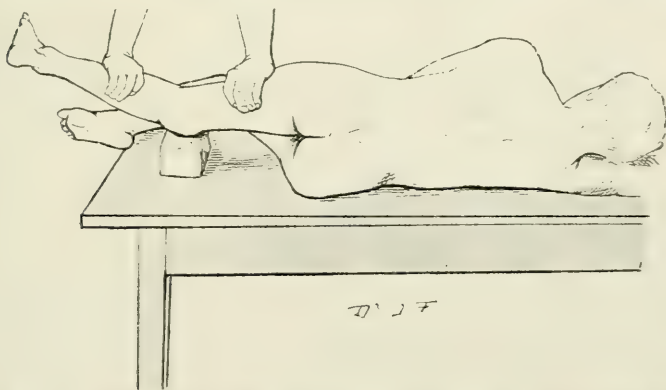


Fig. 653. — Redressment of genu valgum: the patient is laid on the sound side; the internal surface of the knee is placed on a block; one fixes the femur and presses on the foot and lower part of the leg, by small rythmical thrusts.

been obtained, you fix the limb with a plaster reaching from

the trochanter to the malleolus (v. fig. 656). With the plaster apparatus the child is able to walk if the parents wish it.

The mean duration of the treatment is 5 or 6 months.

Is it necessary for me to describe in detail the manœuvres to be made in order to arrive at the correction?

It is evident that, since the femur and the tibia make an angle with it's concavity outwards our manipulations, our tractions, our pressure will tend to open that angle, in acting on the two extre-

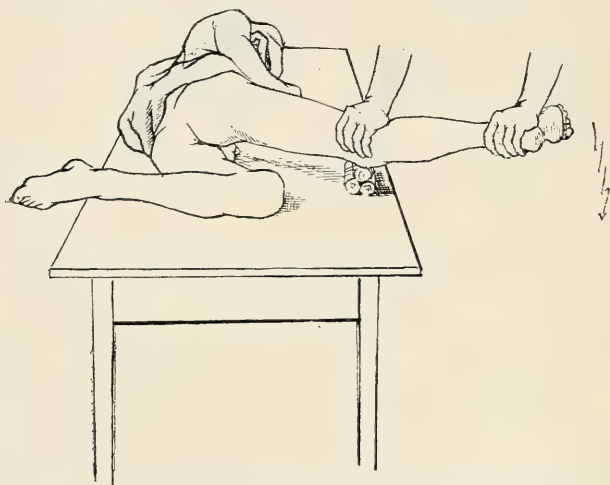


Fig. 654. — Genu valgum. Redressment. One rests the internal condyle on a « hard tampon » made of three bandages of muslin tied together.

mities (trochanter and malleoli) in order to push them from without inwards, whilst another hand will push in the opposite direction, from within outwards, the apex of the angle which corresponds to the internal condyle of the knee (fig. 651 and 652).

During the redressment, the patient may remain laid on his back, but it is better to place him on the sound side (of the trunk), then to draw back the sound limb, in such a way that the internal surface of the affected limb, or rather of the internal condyle, rests upon an edge of the table covered with a serviette folded in eight. The thigh and the leg being kept in this posi-

tion by an assistant, you yourself take the foot and move it upwards and downwards, little by little, until you have brought it down to the level of the table and even below that level, in order to obtain a hyper-correction of from 15° to 20° (fig. 653 and 654).

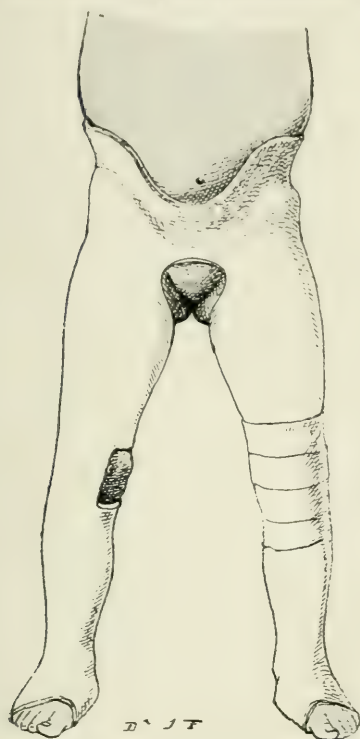


Fig. 655. — Double plaster apparatus—furnished with openings, to permit of compression with cotton wool over the internal condyle.



Fig. 656. — Plaster apparatus permitting of walking, after the redressment.

It is necessary to take care, in these manipulations, to keep the leg in forced extension upon the thigh (fig. 651 and following).

b) The case of a genu valgum very marked.

It is here necessary to prolong the manipulations up to 10 or 15 minutes.

They will be made with or without chloroform, according

to the pleasure of the surgeon; one may dispense with chloroform, because, if the manipulations are made gently, progressively, methodically and slowly, they are not, or very rarely, painful. When the child is fatigued, one desists, to renew them one or



Fig. 657. — Three brothers affected with double and severe genu valgum.

two minutes afterwards, or even better, one is content, for the first sitting, with a partial correction.

However, I advise you, in a general way, to have recourse to chloroform, because it facilitates the proceedings and enables you to obtain a complete result at once.

GENU VARUM

It goes without saying that in the case of *genu varum* one



Fig. 658. — The same, five months after simple orthopædic correction by us in three sittings, a large plaster afterwards.

performs similar manipulations, but in the opposite direction, to arrive at a correction (fig. 659).

The correction or hyper-correction obtained, it is necessary to know how to maintain it entirely; but, in order to maintain a correction of the knee, one ought to include the two adjacent

articulations, that is, the ankle and the hip [with the pelvis] (see fig. 655, p. 613). When the last bandage has been applied and **before the plaster sets**, one makes certain that the degree of correction previously obtained by the manipulations is maintained exactly, but no more; because in one's desire to add something by pressure forcibly made through the plaster, one runs the risk of causing a sore, particularly over the internal condyle.

If one has any reason to suspect a sore, or if the patient complains much at a point near the internal condyle, on the evening of, or the day after, the application of the plaster, it is well to make an opening opposite the spot, and replace the square of plaster by several squares of cotton wool which may be retained in position by a bandage, just as in compression of a gibbosity in Pott's disease (v. Chap. v). This precaution allows of one preserving exactly the correction, without running any risk (fig. 655).

When there is a "double genu valgum", one corrects both at the same time, and a large plaster will immobilise both the lower limbs, with an abduction of the thighs of from 30° to 40° (fig. 655).

If the correction has not been completely made at the first sitting, one removes the plaster in a week or two, to complete the correction.

One makes a new redressment, gentle and progressive, repeating the manipulations described above, followed by the application of a new plaster for a duration equal to the first, and so on, until one has obtained a correction not only sufficient, but more than sufficient, until one has transformed the genu valgum into a genu varum of from 15° to 20° .

For, here as everywhere, it is necessary **to obtain too much in order to preserve enough**.

When the hyper-correction has been obtained (in one or several sittings), one secures it with a plaster which is left on for two or three months.

After being thus fixed for about two months and a half, in hyper-correction, one may set the child free from all apparatus, but yet at repose in the sitting position for four or five weeks.

During this time, the cure becomes confirmed, the knee recovers its movements, and the muscles become stronger. To assist it, one massages and bathes the child, and one mobilises the knee carefully (two short sittings of one or two minutes every day).

After that, the child is made to get about with a knee-piece supporting the stiffened knee, a moveable knee-piece in plaster or celluloid, reaching from the ischium to the malleoli,



Fig. 659. — Genu varum. Redressment. The knee reposes by its external condyle upon a bandage of firm canvas, against which it is held by an assistant: the surgeon presses on the foot by jerks to correct the deviation.

which one takes off outside the hours of walking, but which must be worn for walking during two or three months.

In about six months from the commencement of the treatment, the cure is accomplished and the child has no longer any need for an apparatus.

You surmise that one would, if the friends requested it, after the removal of the large plaster, place the child at once on its feet with the knee-piece, removing the latter at night, in order not to allow the knee to become stiff.

On the other hand, as long as the large plaster is worn, the

child remains at rest. Nevertheless, it may, strictly speaking, walk with the aid of crutches.

If I mention this question of walking during active treatment, it is because it is nearly always raised by parents. You will find a good number who will refuse to agree to a treatment which creates an impossibility of walking, even when it is a question of a marked degree of genu varum.

If the parents will not listen to you either as to rest or to crutches, this is how you would treat the case :

Treatment with a plaster permitting walking

You will redress, at several sittings (without anæsthesia), bearing in mind what we have told you (p. 613). After each new slight correction, in place of a large apparatus taking in the pelvis, you will apply a plaster reaching from the groin to the malleoli, and leaving at liberty the adjacent articulations (see fig. 656); the child walks with this apparatus.

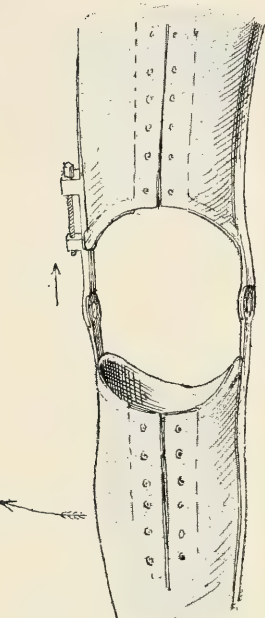


Fig. 660. — A movable apparatus with a screw which is turned slightly every 2 days, to restore the straight position.

You may thus arrive at a cure; only it will take two or three times longer than the other method, each correction being maintained less perfectly.

For the same reason you will be asked to carry out :

The Treatment with Orthopædic Apparatus for Walking.

These apparatus for walking attract parents *a priori*. For my part, I do not advise you to use them, because they are very delicate to manage, too likely to get out of order, and because, after all, and in spite of appearances, they constitute

a less simple form of treatment than the correction without chloroform made every eight days, followed by the application of a plaster knee piece. However, if the parents are obstinate and prefer an orthopaedic apparatus, take a mould of the deformed limb and send it to the instrument maker; he will send you a rack-work apparatus, which the parents will alter as directed every two days, and which will end, if it is well constructed and well looked after, in bringing about a satisfactory redressment (fig. 66o). But this method of procedure is certainly much longer and more unreliable than the use of

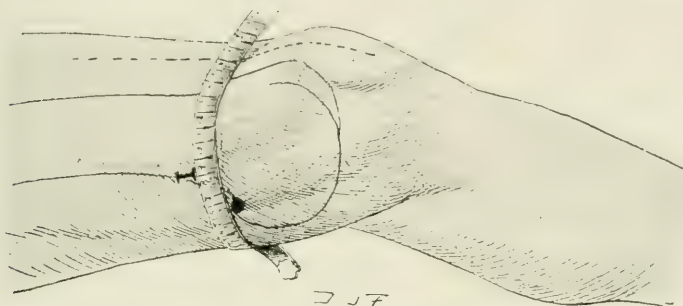


Fig. 661. — One makes an incision in the skin (above the swelling of the internal condyle) over a line *equi-distant* from the anterior median line and the supero-internal margin of the popliteal space. (The black spot marks the adductor tubercle).

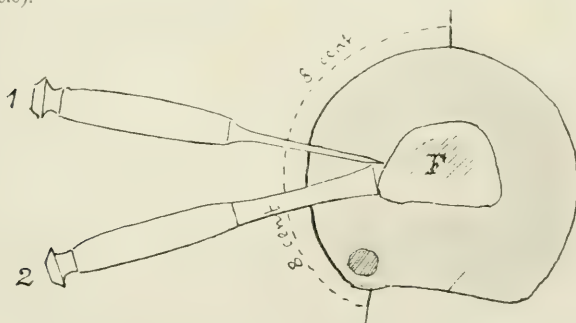


Fig. 662. — Schema showing the manner in which the osteotome reaches the femur (F.). 1. The osteotome is pushed into the soft tissues, parallel to the axis of the wound, up to the bone. 2. It is afterwards turned round perpendicularly to the wound and the handle is carried backwards to attack the bone from behind forwards and within outwards.

successive plasters. It ought only to be an **exceptional treatment**, or **one of necessity**.

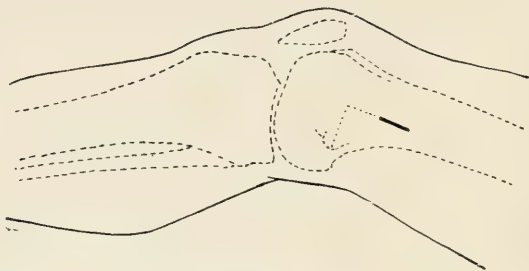


Fig. 663. — Place of election marked on the bone for the incision; two centimetres above and one centimetre in front of the adductor tubercle.

2nd METHOD. — SUPRA-CONDYLAR OSTEOTOMY

I do not make to osteotomy any other objection than that it is a cutting operation which one ought to avoid; one does not cure with it much more quickly than with simple redressment.

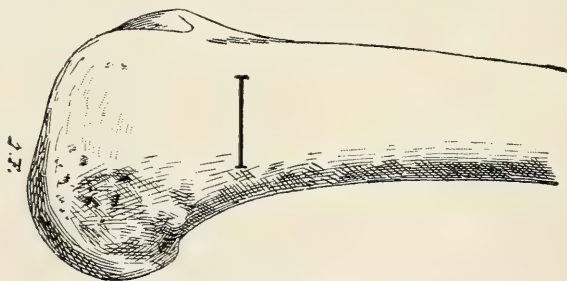


Fig. 664. — Second stage. Then one turns the osteotome cross-wise. — Point where one ought to perform Mac Ewen's osteotomy.

It is true that it demands of the surgeon himself a little less time.

I reserve the operation, myself, for certain very resistant cases of genu valgum in the adult, and even here one can obtain the correction by a simple redressment; we will return to this in the special chapter devoted to genu valgum in adolescents.

In any case, it is an operation which you should know how to perform.

Technique of Supra-condylar Osteotomy

(fig. 665 to 668)

Instruments : bistoury, chisel and mallet.

In small children, of whom we are speaking exclusively

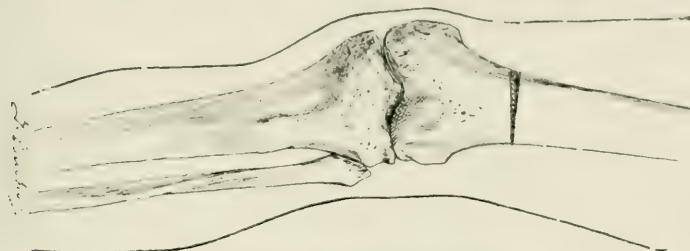


Fig. 665. — The section made.

here, the mallet is not always necessary in order to divide the bone; it is sufficient to push the osteotome with the two hands.

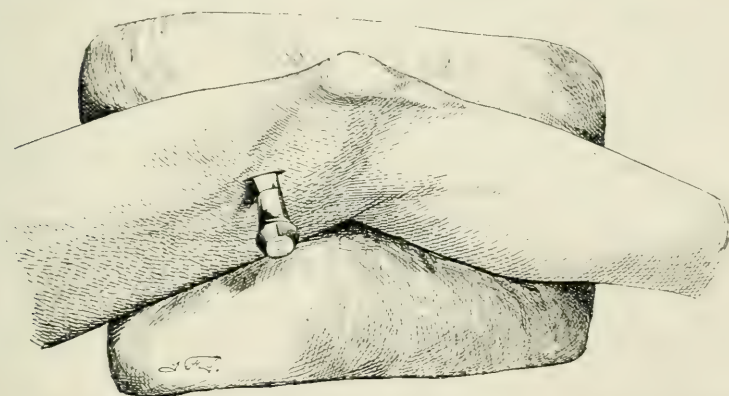


Fig. 666. — Introduction of the osteotome, its edge parallel to the axis of the limb.

However, as the bone may be very resistant and even eburnated, you should always have a solid mallet in reserve.

Have in addition a **cushion of moist sand** upon which the knee will rest on its external surface.

Position of the Knee : flexion, abduction and external rotation of 30° (fig. 666).

1st The Incision: at 2 centimetres above the superior border of the internal condyle, and in front of the tubercle of the adductor magnus (the tendon is quite easily felt), you commence an incision of 2 cm. **ascending parallel to the axis of the thigh.** The bistoury goes with one cut down to the bone and divides the periosteum.

2nd One introduces the osteotome parallel to the incision, down to the bone, then one turns it transversely in a direction inwards and backwards, and (from 10° to 15°) from behind

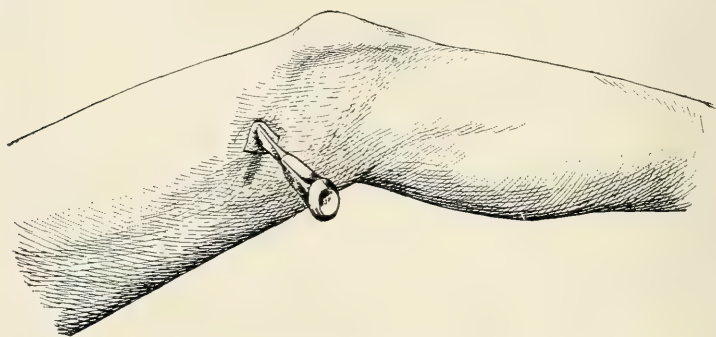


Fig. 667. — Arrived at the bone, the osteotome is turned round, the edge perpendicular to the axis of the femur.

forwards; in this way, there is nothing to fear for the popliteal vessels and nerves, from which the osteotome gets further and further away, in proportion as it penetrates. All that is possible to happen, at the worst, is to go through the skin over the external side of the knee; but that is not a serious inconvenience, with good asepsis.

If pushing with the hand is not sufficient to make the osteotome penetrate the osseous tissue, one can make it do so with some sharp and precise taps with the mallet, held firmly. One osteotome will be sufficient.

It is often necessary to give from 15 to 20 small taps to effect the breaking of the two-thirds or three quarters of the thickness of the bone. One feels instinctively when one is

there; one ought also to have a graduated osteotome which records the degree of penetration.

3rd One finishes with an **Osteoclasis**. It is better not to divide the bone completely. When the bone is cut to $\frac{3}{4}$ of its thickness, one withdraws the osteotome, a tampon is placed over the small wound, and one endeavours to break the bone by manual force.

It is sufficient to press from within outwards on the lower fragment, by taking, in order to elongate the arms of the lever of the small fragment, the entire limb held in complete extension, or better, in hyper-extension. One presses firmly in this way (two or three times) until the bone gives way.

4th One corrects the deviation, one makes even a hyper-correction of from 15° to 20° . The genu valgum is thus changed into a slight genu varum.

5th One applies a large plaster (see fig. 665).

This is removed at the fiftieth day. Then, the same proceeding as above after simple redressment: the patient walks for two months with a movable knee piece: massage and slight mobilisation of the knee.

Relapses. You will not have any, neither after redressment nor after osteotomy, unless: 1st. you have been satisfied with an insufficient correction, or. 2nd. you have left the child

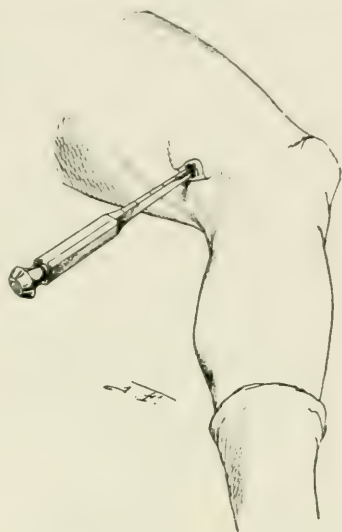


Fig. 668. — The osteotome ought to enter the femur from within out and rather from behind forwards: the osteotome is pushed by the hands (or, if the hands are not enough, by slight blows with the mallet) until the bone is divided to three quarters its thickness. The instrument is then withdrawn and the resisting fibres of the bone broken by pressure exercised from within outwards upon the limb placed in hyper-extension.

without an apparatus before the complete cure of the rachitic vice. It goes without saying, that whilst Rachitis is in progress, you ought not to allow the child to walk and especially to walk without a very good support.

B. — RACHITIC DEFORMITIES OF THE TIBIA

The deformities of the legs affect generally the lower third, of the bone, and assume two principal forms : a curvature with an external convexity, and a curvature with an anterior convexity.

A good **general treatment**, a stay at the **sea-side**, and



Fig. 669. — A vertical incision opposite the external border of the tibia, the osteotome is placed parallel to the wound (1st step).

rest, are sufficient to make slightly marked deviations of the tibiae disappear.

How many children come to the sea-side, whose distorted legs appear to justify an osteotomy, and who, without anything having been done, return six months later, with legs straight or fairly straight! That is the case of nearly all.

If you are not able to send the child to the sea-side, or if a stay at the sea-side is not sufficient in some exceptional case, you will have to interfere actively; but it is understood that you will only do this if it is worth the trouble, when the deviation is sufficient (an angle of more than 30° or 40° for instance) to render walking defective and produce a noticeable reduction in height, or where a line drawn from the middle of the patella to the anterior spine of the tibia and prolonged downwards, leaves the foot completely without or within it.

It is necessary then to make **a correction**. How will you do it?

1st You will endeavour **to redress** the leg **with your hands**, bending it, like a soft iron rod, or a piece of green wood. This is possible for a certain length of time, from a year and a half to nearly three years; sometimes up to four or five years.

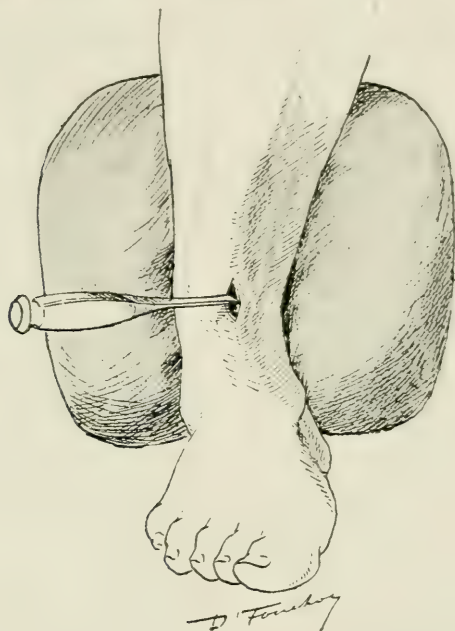


Fig. 670. — Osteotomy of the tibia (sequel); the edge of the osteotome is turned perpendicularly to the wound and comes in contact with the tibia from without inwards

However, there is no fixed rule as to this, it varies much with the children, the development of rickets being prolonged in some instances. You will attempt it then, in **all cases**.

You will proceed at first with gentleness: but, if in exercising a force of some kilogrammes, you do not succeed in making the bone bend, still continue; use a force of from 30 to 40 kilogrammes (this varies, but I prefer to give you an idea of the effort to be employed), and then the bone **will bend**,



Fig. 671. — A radiograph after *osteoclasis* made by the hands for rachitic deformity of the legs (in a child six years of age).

or you **break it**, which is again a favourable solution (fig. 671), or the bone refuses to yield.

If the bone is resistant, perform an **osteotomy**, not on the

same day, but a little later, when the contusion of the tissues has passed off.

This osteotomy will be **linear**, and not curvilinear or



Fig. 672. — A case of severe multiple rachitic deformities of the lower limbs treated by multiple osteotomies. Here, one has cut the femur from without inwards. (The upper section).

cuneiform, because the first is much **more simple** for you, and certainly **as effective** as the two others (fig. 671 and 672).

So as to be certain of avoiding all the important vessels and nerves, you will enter from **without inwards**, from the external surface towards the internal surface of the tibia, contrary to what is said in books. You will support the limb afterwards with an ordinary plaster apparatus (v. p. 613, fig. 655).

C. — DEFORMITIES OF THE FEET

OF RACHITIC ORIGIN (RACHITIC FLAT FEET, ETC.)

The general treatment is the same as given above, and for local treatment, that of ordinary club-foot (v. Chap. xv) or of the flat foot of adolescents (v. p. 645).

The redressment is made at one, two or three sittings, then one proceeds to a veritable fashioning of the feet, which one supports with permanent plaster for two, three or four months, and afterwards with a small celluloid apparatus, which one can introduce into ordinary boots.

D. — DEVIATIONS OF THE FEMUR

In a general way, I recommend here merely the general treatment and rest. It will probably never happen that you find yourself in the presence of deviations of the femur so marked that a linear osteotomy may be necessary to secure a certain benefit to the patient.

If it should, you will make a longitudinal incision 3 or 4 cm. in length on the antero-internal surface of the thigh, but *at two fingers breadth outside the artery*, always easy to locate; then you will go by means of a *button-hole*, between the muscle fasciae, down to the bone. You will then introduce your osteotome on to the internal surface of the bone; you will turn it round transversely in order to push from within outwards (or from above downwards), towards the external aspect of the thigh which has become the inferior, this external surface resting on a very firm cushion of damp sand (fig. 672).

E. — COXA VARA

Coxa vara. — Look at, in fig. 673, the normal direction of the neck in relation to the diaphysis. The neck forms with it an obtuse angle of 130° , that is almost a right angle and a half. There is a coxa vara when the neck has become weakened until it has become perpendicular to the diaphysis (fig. 674) and much more so when it makes an acute angle with it (fig. 675).

[On the contrary, if the neck is raised making an angle

much more than 140° (fig. 676), we have a **coxa valga** which is rather rare. |

I mention coxa vara here because it is nearly always of rachitic origin, in the same way that genu valgum is¹.

As in that, coxa vara is observed either in children of two or three years of age, or in adolescents of from twelve to eighteen years. The two deformities are produced under analogous influences.

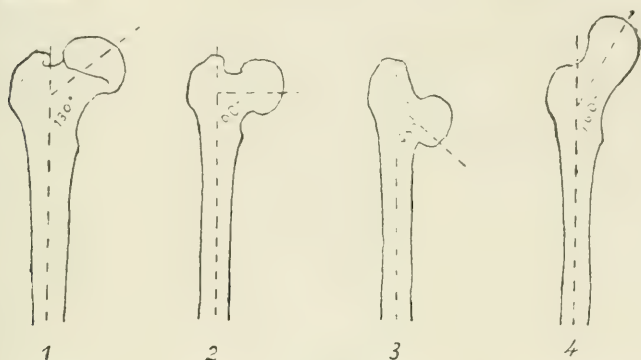


Fig. 673.

Fig. 674.

Fig. 675.

Fig. 676.

Fig. 673. — *Normal femur*. The axis of the neck makes with the axis of the diaphysis an angle (at the base) of about 130° degrees.

Fig. 674. — *Coxa vara* medium degree). The angle of the neck and the diaphysis is a right angle.

Fig. 675. — *Coxa vara* of very severe type. The angle of the neck and the diaphysis is only 45° degrees.

Fig. 676. — *Coxa valga*. The angle of the neck and the diaphysis is of 100° degrees, instead of 130° degrees, the normal angle.

We are speaking here only of coxa vara in very young children.

It is because these children walk badly, **because they are lame**, that **they come** to consult you. And it is necessary to know that **this lameness** may be mistaken for that of **congenital luxation of the hip joint**.

1. Coxa vara may be a congenital deformity, like luxation of the hip, for example, and it very often co-exists with it. But it is generally due to some defect of nutrition of the bone; rickets, osteomalacia, etc.

A secondary coxa vara may be produced in coxitis (see fig. 674 and 675) or even as a sequel of fracture of the neck badly united.

The diagnosis of coxa vara and congenital luxation of the hip. The child **swings** from side to side and **pitches** heavily in both cases. If one goes by the characteristics of the gait in children with their clothing on (without any other examination) **one may often be deceived**.

It is not only the characteristics of the gait, **there are other signs common** to the two diseases.

Unilateral shortening of the leg may exist in coxa vara, as in luxation.

In both cases, walking has been late, the trochanter is above Nelaton's line ; there is a hollow in the lumbar region and a large abdomen; there is limitation of the movement of abduction of the thigh, consequently of contraction of the adductors.

How do you distinguish the two affections? One may already say, *a priori*, that luxation being 100 times more frequent than coxa vara, there are 99 chances in 100 that one is dealing with congenital luxation rather than with coxa vara.

Further, in the case of coxa vara, there are antecedents and other manifestations of rachitis, but that is not sufficient to establish the diagnosis.

It is indispensable to establish the diagnosis thoroughly, because of the absolute difference in the treatment. Luxation can only be cured by reduction. Coxa vara will be cured by the treatment for rachitis, or sometimes spontaneously. This is how certain lamenesses from birth, mistaken for luxations, and which were coxa vara, have been cured without treatment.

Most fortunately, we have **two certain means** of making a diagnosis :

1st. The X rays;

2nd. Without the X rays, ascertaining, by **palpation** if **the head** of the femur is in the natural position.

If you do not find the head of the femur beneath the femoral artery, it is a case of luxation. If you do find it there, it is one of coxa vara.

In short, you are never able to affirm the presence of one or

the other of the two maladies until you have made a careful palpation of the hip joint¹.

Remember that the two conditions may **co-exist**, that *coxa vara* occurs frequently with congenital luxation.

Diagnosis of coxa vara (unilateral) with Coxitis.

Common signs. — Lameness, limitation of movement of abduction, slight external rotation of the knee.

Differential signs. — In *coxa vara*, the leg shortens (and does not elongate as it does in *coxitis* at the beginning). — In *coxa vara*, the trochanter is above Nelaton's line. There is no pain on pressure over the head of the femur, as in *coxitis*.

No nocturnal pains. **There are other signs of Rachitis**, etc. The child sways from side to side in *coxa vara*, whilst in *coxitis* he drags the leg. Further, *coxitis* is rare at one or two years of age, whilst *coxa vara* is chiefly seen at that age : Finally, *unilateral coxa vara* is exceptional.

The Treatment of Coxa vara.

One is scarcely ever called upon to treat *coxa vara* until lameness has set in. The treatment is that of rickets, general treatment, sojourn by the sea, phosphates, milk diet, etc., and local treatment, rest and continuous extension.

This treatment nearly always suffices to cure *coxa vara* in young children, and to bring about, after a year or two, the disappearance of the swaying motion and the duck-like waddle².

II. — THE RACHITIC DEFORMITIES OF THE TRUNK

A. **Thoracic** Deformities (without scoliosis or kyphosis).

B. **Vertebral** deviations : **Kyphosis** and **scoliosis**.

1. In *coxa vara*, the trochanter neither ascends nor descends at each step as in luxation (v. 712).

2. In adolescents, there are some very rare and severe cases where these means are not sufficient and where one is obliged to have recourse to complexed surgical operations (v. p. 643).

A. — THORACIC DEFORMITIES

These generally assume one of the two followings forms :



Fig. 677. — Thorax boat-shaped or *en brechet*.

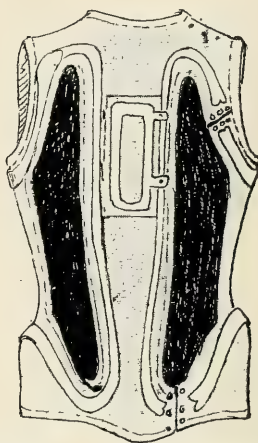


Fig. 678. — Corset in celluloid with **anterior opening** for compression in the case of boat-shaped thorax.

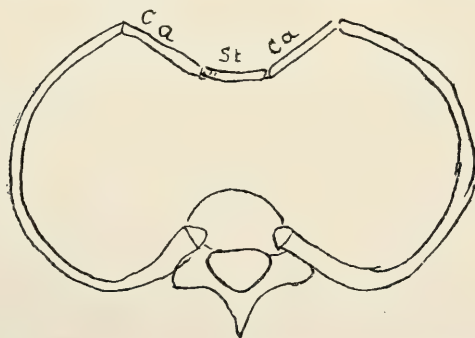


Fig. 679. — Funnel-shaped thorax : St, sternum : Ca, costal cartilage.

1st. The boat-shaped breast (fig. 677) : 2nd. The funnel-shaped thorax (fig. 680).

1st. For the first, I advise an irremovable corset in plaster, or better, a movable corset in celluloid, with an *anterior opening* opposite the thoracic projection (fig. 678).

One will exert over this point a compression with squares of cotton wool, as if one were treating a gibbosity in Pott's disease (v. Chap. v). One will arrive thus at excellent results, fairly rapidly, in the space of 8 or 12 months, on an average.

2nd. It is not so easy to correct the **funnel-shaped** thorax (fig. 679 and 680).

We have employed here, with some success, the prolonged use of celluloid corsets with an opening, always patent, opposite the depression.

One removes the corset several times a day, to perform respiratory exercises (p. 578).

Whilst the child makes the movements for enlarging the thorax by forced inspiration, one compresses the two lateral surfaces of the thorax with the hands placed upon it flat. One may also direct these children to blow the horn vigorously; in a word one makes use of any exercises which will efface, little or much, the thoracic depression.

The child should lie quite flat. Sometimes when the child is lying down one may see the deformity slightly lessened on placing a pillow under the back. If that is so in the case of your particular patient, use this simple device during the long night's rest.



Fig. 680. — Funnel-shaped thorax.

B.— VERTEBRAL DEVIATIONS.— KYPHOSIS AND SCOLIOSIS

Rickets sometimes brings about a kypnosis, rarely a lordosis very often (in 15 cases in a 100 cases of rickets) a scoliosis.

The vertebral deviation may even be, in certain cases, the only (visible) osseous manifestation of Rickets.

1st **Kypnosis and Scoliosis in children from 1 to 6 years of age.**

DIAGNOSIS

a. **Kypnosis** (fig. 681). — Rachitic Kypnosis differs from that of a **Pott's disease** (v. Chap. v) :

1st. *By the shape of the vertebral gibbosity*, which is not angular, as in Pott's disease (v. p. 241), but rounded.

2nd. *By the absence of vertebral stiffness*. The patient being laid on his abdomen, if he raise his legs backwards (v. fig. 214 and 215), the deviation here is effaced, whilst in Pott's disease it persists.

3rd. *By the absence of pain* on pressure and the *absence of contractures* of groups of neighbouring muscles, whilst pain and contracture exist in Pott's disease.

4th. *By the antecedents*, and the frequent co-existence of **rachitic lesions** in other parts of the skeleton.

b. **Scoliosis.**

The **diagnosis of the nature** of the Scoliosis is easy to make in children of from 1 to 6 years, for at that age it is always rachitic.

TREATMENT

If the deformities are only a little marked, place the children at rest and make them live at the sea-side for eight months or a year.

If the children cannot go to the sea-side, or if the stay there is insufficient to redress very marked deviations, do more, redress the spine and support it afterwards with a plaster.

One redresses the spine as one would a club-foot, in one or several sittings, with or without chloroform, by manipulations,

malaxations in the directions, or different directions, wished. You begin again with a mobilisation of the spine, already more or less fixed in its defective position. Once this mobilisation is accomplished, you place (with the pressure of 2 or 4 hands)



Fig. 681. — Rachitic Kyphosis; the deformity is not angular as in Pott's disease, but rounded.

the vertebral column in a corrected position, or partially corrected position if you proceed by stages. You support the spine in that position with a plaster corset, either a large corset (v. p. 275) which would be the best, or a medium apparatus with a "col d'officier" when the large apparatus is objected to by the parents.

You apply the apparatus in a very moderated extension of the spine: the greatest extension which one can make without

the heels leaving the ground (v. p. 277). In order that your apparatus may be exact and accurate, before the plaster sets, re-make with your hands, by pressure made through the still pliable plaster, the correction you have obtained, and maintain it exactly until the plaster is quite set.

Next day, when the apparatus is quite solid, you will take care to make an opening at all the points

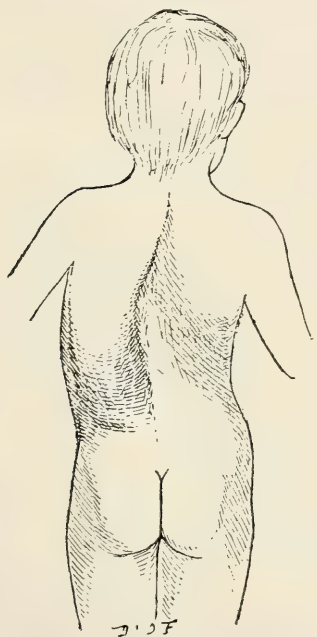


Fig. 682. — Most often the rachitic scoliosis has its convexity to the left, as in this case.

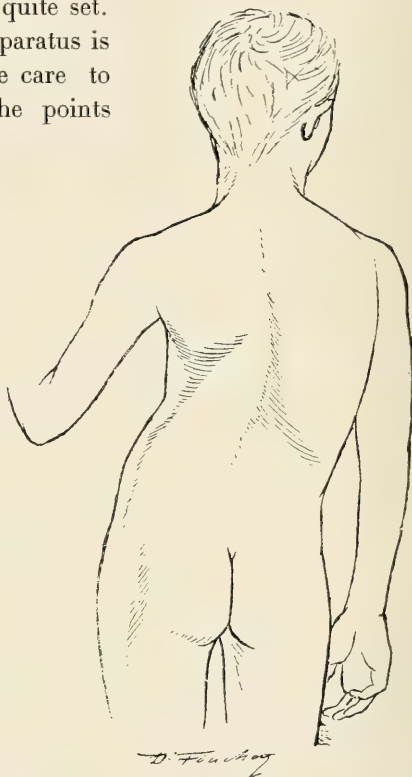


Fig. 683. — Rachitic scoliosis of the right side is rarer than on the left side.

where you brought pressure to bear with your hands.

That is necessary; if we do not make such openings, we shall have sores at those points, and more than that, we shall lose something of the correction. If we make them, not only shall we have no sores and lose nothing of the correction, but

we shall be able to add to this with squares of cotton-wool placed in increasing numbers during the following weeks.

But you have already learnt to correct the gibbosities of Pott's disease in this way (v. Chap. v).

The child will be kept at rest in the recumbent position. If the parents force your hand, you may, as a last resource, allow him to walk a little, for instance, half an hour or an hour every day.

The plaster will be left in position for eight weeks; then you will remove it to make a new correction followed by a new plaster; and so on, until the correction is sufficient, which requires from eight to twelve months, and even longer.

When it is complete, one may, instead of a plaster, apply a corset in celluloid or leather, with openings and shutters for compression, and the child will be able to walk with the apparatus.

Celluloid has this advantage, that one can take it off every day, and even several times a day, in order to carry out redressing exercises and massage (v. *Scoliosis*, Chap. viii).

In the hospital, and in private cases not well looked after, I advise you to keep on an immovable plaster during the period of convalescence.

With very good general treatment, and local treatment carried out in this way, one arrives at surprising results in dorsal deformities of rachitic origin.

I may cite, among others, a child of four years, Pierre B., of Chaumont, who was sent to me by my master Jalaguier; he had a scoliosis so complex and serious, that after examination I scarcely dared to hope that I should arrive at any kind of result. For a year, the deviation was hardly improved, the general condition remained bad and hampered the continued use of the plasters; but, in the second year, the sea air had fortunately modified the general nutrition, the apparatus were tolerated, so that, after two and a half years' treatment at Berck, this horrible deviation was completely obliterated. I have seen results nearly as striking in the generality of cases.

One may however have to deal with a scoliosis of particularly malignant character, but this is the greatest exception, — and I am able to promise you that, if you carry out the treatment exactly, you will arrive at very satisfactory cures in the rachitic scoliosis of young children.

2nd. **Rachitic Scoliosis of older subjects** [from eight to twenty]. (See note to page 568).

What I have just said as to the generally favourable prognosis of rachitic scoliosis is applied **exclusively to very young children**; for if these rachitic scolioses have not been treated from their first appearance, if they have been allowed to develop up to 10, 12 or 15 years, their correction becomes very difficult and almost impossible; it is these **rachitic scolioses** which will form, later on, the **quota of the severe scoliosis** with lateral bosses; but it is necessary for us to describe how, in a child of from 10 to 15 years, who comes to you with a scoliosis, you will recognise whether it is a question of **rachitic scoliosis** or the **essential scoliosis** of adolescence, that studied on p. 567; they are **differentiated** by a great number of characteristics :

1st. By the **date of appearance**. The rachitic scoliosis commences in the first eight years of life, that is, before the age for going to school, whilst essential scoliosis, “ the school complaint ”, is especially frequent between eleven and sixteen years.

2nd. By the **clinical and anatomical condition**. The rachitic scoliosis has a **single curvature**, or rather it appears single, the secondary curvatures, cervical and lumbar, being situated very high up, or very low down; the **apex** of the great curvature in rachitic scoliosis corresponds closely to the **middle of the spine**, whilst, in essential scoliosis, the curvature, when it is single, has a larger radius, and its apex corresponds either to the back, or to the loins, and, later, when two curvatures exist, one is distinctly dorsal, the other distinctly lumbar, and they often have an obviously equal importance.

3rd. As we have already said, **by their very different prognosis**.

Rachitic scoliosis is essentially, and by its long standing, much more malignant and more serious than "essential" scoliosis.

The great deformities, the lateral gibbosities like the sides of a melon, the twistings and depressions of the trunk, which make, in a word, the **malignant scolioses**, belong **almost exclusively to true Rachitis**. Here, the bones are eburnated, the articulations already more or less ankylosed, which adds still more to the difficulty of treatment.

The treatment is like that of scoliosis of the third degree (v. p. 600) : it is here, in fact, a question of scoliosis of the third degree. At first a treatment by gymnastics is necessary to mobilise the spine, then quarterly forced redressments, followed by the application of a large plaster apparatus.

One keeps to these severe apparatus until the fixation of the spine in a satisfactory position. These treatments require from two to three years, with a stay at the sea-side. It is, then, comparable to that of Pott's disease.

Once more, take care how you undertake the treatment of these malignant scolioses against which we are still so poorly armed, and of which one¹ has been able to say with so much truth : " Since congenital luxation has ceased to be the opprobrium of surgery, the title has gone by right to the old rachitic scolioses ".

In the presence of these bad cases (v. fig. 684), which are not worth the disappointment, practitioners may learn to remember *à propos*, that there exists some part of the specialists' work which they may let pass.

1. Dr Bergugnat.



Fig. 684. — Very old rachitic scoliosis (3rd degree).

CHAPTER XI

GENU VALGUM (OR VARUM) OF ADOLESCENTS COXA VARA OF ADOLESCENTS

It is designedly that we are studying these deformities immediately after Rachitis to which they are connected by more than one tie, so much so that they may be confounded with it.

There should be much to say on this point but we wish here to avoid all pathological discussion, and we will simply maintain, as to this relationship, that in the presence of genu valgum and coxa vara of adolescents, we shall have to carry out, as for rachitic deviations, outside of the local treatment of the deformity, a **general treatment** : a. dietetic (milk, eggs, etc.); b. climatic (life by the sea, if possible); c. medical (cod liver oil, iodine, phosphates and phosphorus in all its forms).

The general treatment you know; the **local treatment** is equally well known to you, after what we have said of genu valgum and coxa vara in young children.

1st GENU VALGUM (OR VARUM)

The deformity exists on one or both sides. Refer to p. 608, where we have indicated the course to be followed. As in young children, the correction may be obtained by simple **redressment** of the knee, or by supra-condylar **osteotomy**.

Of these two treatments, which will you choose?

If you are something of a surgeon, perform osteotomy, a

benign and simple and *more expeditious* operation, the particulars of which are set out on p. 619.

But if you, or the parents, wish to avoid "a hole in the skin" and the effusion of a drop of blood, you can do so; one can effect **redressment** by simple orthopedic manipulations at this age, as in young children; only it will require a little more time.

And, in the same way as in young children, if the parents demand of you a treatment not involving the impossibility of walking, you will be able to satisfy them, because the cure can be obtained in spite of walking, on the condition that you are given the additional time you desire.

In that case, to allow of walking, you terminate your plaster above at the upper border of the great trochanter, and below, opposite the malleoli (see fig. 656).

In the case of **genu varum**, one carries out a similar treatment in the opposite direction.

2nd COXA VARA OF ADOLESCENTS.

We have spoken of coxa vara in young children on p. 628.

According to German authors this deformity is generally observed in young persons who are employed in the fields; hence the name *Bauerbein* in opposition to that of *Baekerbein* (baker's leg) given by them to the genu valgum of adolescents; however, I ought to say that, for my own part, I have seen it only in private cases, still attending school. I may add that this deformity is very rare in France.



Fig. 685. — Attitude in coxa vara, adduction and external rotation.

if I can trust my own observation. I have not seen more

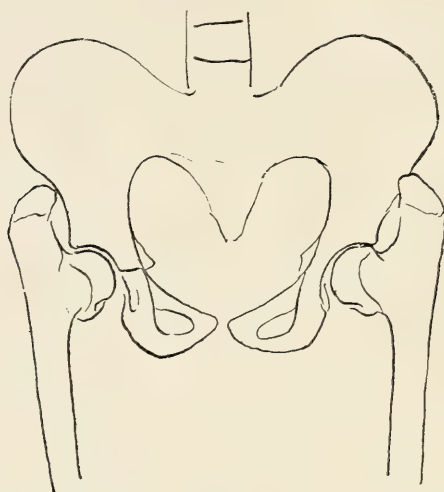


Fig. 686. — A severe case of coxa vara (after a radiogram of one of our patients, aged 14 years).



Fig. 687.



Fig. 688.



Fig. 689.

Fig. 687. — 1st step of operation : separation of the neck from the diaphysis.

Fig. 688. — 2nd step : refreshment of internal face of great trochanter.

Fig. 689. — 3rd step : traction on the diaphysis and placing in contact the neck and the refreshed face of the great trochanter; then a plaster apparatus.

than 10 cases in 16 years, whilst the Germans say they encounter it very often.

The position of the lower limbs in Coxa vara is characterised by a tendency to adduction of the thighs and to rotation outwards (fig. 685).

The **first sign** may be the appearance of a pain caused by some insignificant injury, or a feeling of lassitude in the legs; but most usually the first sign is here, as in young children, a **defect in walking**, a defect which progresses insensibly until it becomes a real lameness. In advanced cases, one sees the patients stagger, *sway and waddle*, so that one thinks it is either a coxitis beginning, or a congenital dislocation of the hip unrecognised until now, or even an acquired luxation, in the case where the patient attributes the origin of the lameness to a fall or a wound.

The **diagnosis** will be made between the two maladies, as in young children, either by clinical signs alone (v. p. 629) or by the X rays.

The Treatment.

A. *General anti-rachitic treatment:*

B. *Local Treatment :*

a. For mild cases, rest and extension in abduction for 5 or 6 months.

b. For cases rather more pronounced, one adds kneading or even tenotomy of the adductors of the thigh, which are always a little contracted. And one succeeds thus, in a few months, in effacing entirely the defect in walking.



Fig. 690. — Operation performed on one of our cases. The functional result has been very good.

c. But, in very advanced cases (fig. 686), one can scarcely hope for a complete functional cure, — and the treatment is a little uncertain.

One has proposed sub-condylar osteotomy and various resections, and even resection of the hip-joint! This is what we have done in a very grave case :

1st. Division of the bone at the root of the neck (fig. 687);

2nd. Refreshment of the internal surface of the great trochanter (fig. 688); and 3rd. Traction on the femur until adaptation of the refreshed surface and of the external surface of the neck was effected (fig. 689). Suture of the skin with cat-gut (with drainage), and immobilisation for three months in a large plaster reaching from the umbilicus to the toes.

The drain was removed on the sixth day, by a small opening made in the apparatus.

It is necessary to say that the plaster should be, here, particularly well fitting, without which the two fragments will glide over one another and the leg ascend.

The last bandage being applied (whilst the assistants keep up the traction), before the plaster sets, one scratches with the fingers a deep trench above the trochanter, in order to wedge it up. To the same end, the femur will be placed in the greatest abduction compatible with the coaptation of the fragments.

One might also fix the fragments with an ivory peg or even with a metal screw.

See **additional notes on Coxa Vara**, end of Chapter xxvi.

CHAPTER XII

TARSALGIA OF ADOLESCENTS OR PAINFUL FLAT FOOT

A. **Diagnosis.**

Before setting out the treatment, we ought to say a word upon diagnosis; it is necessary, seeing that, in seven cases of tarsalgia which have come under observation in six months, we have seen three errors of **diagnosis** committed by well informed practitioner.

The first had been mistaken for **rheumatism**, the second for a **tuberculous arthritis**, and the third for a **dislocation of the foot** outwards, which is difficult to understand at first, but which is explained in a certain measure by the exceptional contracture in this case (such as we had never seen before) of the peronei and the extensor communis digitorum, which had drawn the foot outwards in valgus, to a point which closely simulated a real dislocation.

In the other two cases, it was the weakness and aching of the foot which had led to the belief that they were cases of rheumatism and white swelling respectively.

Three mistakes in seven cases, it is too much! Nevertheless, exact diagnosis was important here in the highest degree; for, if it were a question of **tuberculous arthritis** (a **blunder commonly made**) one ought to put the patient to rest for at least a year; if it is a question of tarsalgia, the patient, on the contrary, ought to walk about as soon as the foot is redressed, almost at once, and the cure will be complete in two months. You see the unpleasantness to which one is exposed in mistaking the true nature of the malady.

By what signs can one recognise tarsalgia?

1st. *By the age of the patients* — they are adolescents¹. Thus then, in the presence of a painful foot in a patient of from ten

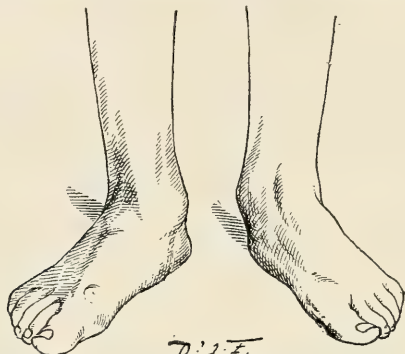


Fig. 691. — Valgus flat feet : one sees in this figure the abduction *en masse* of the foot and the sinking of the plantar arch. Prominence of the scaphoid on the inner border.

to twenty years, *one ought always to think of a possible tarsalgia* and verify the value of this presumption.

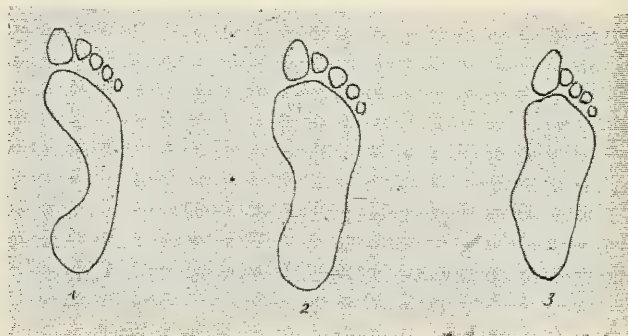


Fig. 692. — 1. Imprint of the normal foot.
2 and 3, Valgus flat foot in two different stages.

2nd. *By the character of the pain* — which has come on generally after a rather long walk, and which has disappeared completely after a night's rest; then, it reappeared on certain

1. Nearly always.

days, when the patient was fatigued, and did not shew itself otherwise. The pain was, at the beginning, a sensation of cramp in the calf and the foot; later on, this became such an agonising pain of stretching of the foot that it was impossible to take a step.

3rd. *By the shape of the foot.* It is necessary to examine the foot naked (fig. 691) with the patient standing upright.

a. The foot is flat, it has no vault; it stands on the ground with the entire sole (fig. 692); the internal border is convex inwards, the apex of the convexity, that is, the most prominent part, is formed by the head of the astragalus and the scaphoid which sometimes touch the ground.

The external border, on the contrary, is almost concave.

b. The foot is thrown en masse outwards, in valgus; this is especially marked when the foot is inspected from behind; the axis of the leg falls well inside the middle of the heel.

c. Under the influence of the upright position, the foot is of a violet hue, it presents varicosities and is sometimes covered with perspiration.

4th. *By palpation of the foot*, which is negative at the outset, one finds neither fungosities, nor pain on pressure over the bone. At an advanced stage, the foot may be swollen, it is true, but it is an uniform oedema, there is no collerette nor any fungous points over the course of the articular synoviae, as in tuberculous arthritis; there may be however, at this time, pain on pressure over the bone, always localised at the internal part

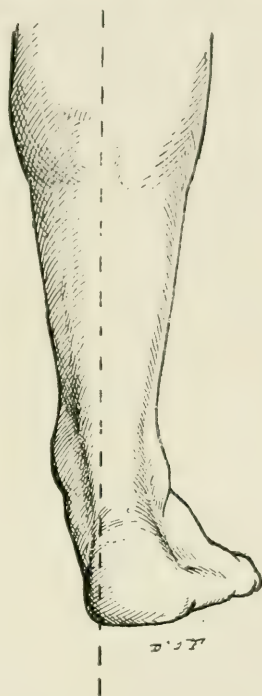


Fig. 693. — Flat foot seen from the back: the axis of the leg falls inside the heel.

of the astragalo-scapoid articulation (fig. 694). The diagnosis will be easy even in this case, thanks to the history, to the shape of the foot and to the absence of fungosities.

5th. **By the two feet being very often affected**, although in unequal degrees (v. fig. 691). The patient complains of only one of the feet, that which causes him the most suffering. It is for you to remember always to examine the other; oblige the patient to recall if he has not suffered a little in the other foot also.

6th. By what one often finds, that **the same conformation**

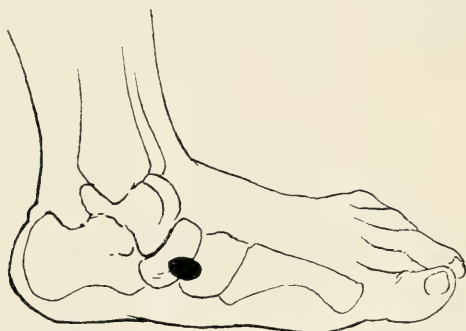


Fig. 694. — The painful spot is situated nearly always at the internal part of the medio-tarsal joint. Here, it is a little in front of that.

of the foot exists **in other members of the family** without pain being present in every case.

We ought to remark, however, that a child with a flat foot is in a condition, just like anyone else, to produce a tuberculous arthritis; one will then find the signs of the two maladies super-imposed.

Upon the whole, and in ordinary cases, the elements of the diagnosis are included in the synonymous denomination of tarsalgia, namely, **painful valgus flat foot of adolescents**; they are all there.

- a. Foot **flat**,
- b. And **valgus**,
- c. With **pain**.
- d. In patients from **10 to 20 years**.

B. — Treatment.

The diagnosis being made, what will be the treatment? That depends upon the variety, or rather, upon the clinical form of the tarsalgia.

One can distinguish **two forms**, one **mild**, the other **severe**,



Fig. 695. — Correction of abduction. The foot is carried bodily inwards, in the direction of the arrow : the dotted line shews the normal attitude of the foot.

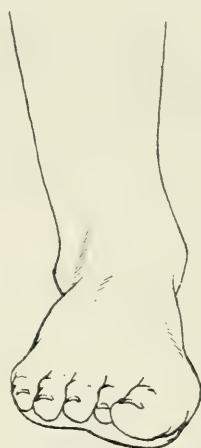


Fig. 696. — Flat foot, front view ; depression of the inner border.



Fig. 697. — The inner border is raised, the external depressed in the direction of the arrows.

which correspond in a general way with the two periods of the disease.

In the first, it is a question of a commencing subsidence of the foot under the weight of the body; pain is present only on walking, and then only on taking rather long walks.

In the second, there is a secondary inflammatory arthritis: a contraction of the peronei and extensor communis muscles: the foot is painful at rest and on pressure: it is fixed in valgus.

and resists “like wood” if one attempts to place it in varus; and such attempt is very painful.



Fig. 698. — The thumbs are placed over the tubercle of the scaphoid; the other fingers of the right hand clasp the internal surface of the os calcis, leaving those of the left hand at the anterior part of the external border of the foot. The thumbs serving as a fulcrum, the two hands work so as to curve the internal border of the foot.

Loss of power is complete or almost so.

Whatever may be the variety of the tarsalgia, the rational



Fig. 699. — Flat foot seen on the plantar surface.

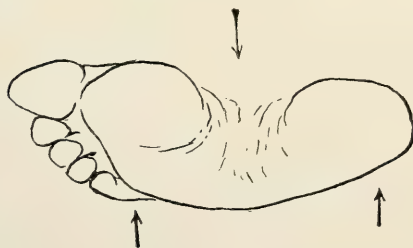


Fig. 700. — Scheme of the manipulation described in fig. 698.

treatment is to *change the statics of the foot, to return it to its normal position and to keep it there.*

TREATMENT OF THE FIRST VARIETY (MILD VARIETY).

a. The foot is massaged once or twice a day, is carried into correction, or rather, hyper-correction, in one sitting of ten minutes, with manipulations in the opposite direction to those made in ordinary club-foot in varus (fig. 695, 696, 697, 698, 699, 700, 701, 702). You explain to the parents how the manipulations are to be performed.

b. The patient is made to wear a boot with the inner border raised two centimetres, with a slight curve to re-form the arch of the foot (fig. 703).

This is sufficient in very mild cases,



Fig. 701. — Raising the inner border of the foot.

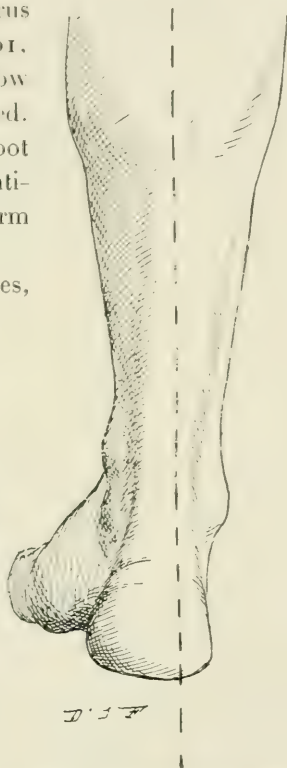


Fig. 702. — Foot corrected : compare this with fig. 693. The axis is over the outer border of the heel.

and the patient is able to continue his ordinary mode of life. If it is not sufficient, one adapts to the boot our lever-sole, in the way represented (fig. 704, 705, 706, 707). Thanks to this boot the patient becomes able to walk immediately like a normal person : it is indeed necessary for him to walk, because, in walking, the

foot becomes shaped more quickly than when remaining at rest.

After from six months to a year, one can return to ordinary boots, simply providing them with an inner border a centimetre higher than the outer.

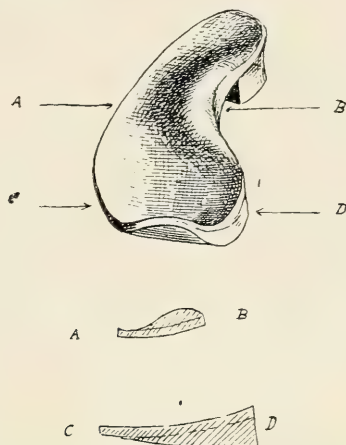


Fig. 703. — Boot sole for valgus flat feet. It is very much curved at its inner border: the sole and the heel are much thicker on the inner than the outer side; at the arch of the foot, it is furnished with a soft pad intended to raise the inner border of the foot.

TREATMENT OF THE SECOND, OR SEVERE, VARIETY OF TARSALGIA

The foot is powerless and painful, and is fixed in valgus.

If one wishes to manipulate it, the patient cries loudly, and nevertheless, it must be manipulated. — This is how it is done.

A. **With chloroform.** — There is an easy and expeditious way to succeed in this; it is to put the patient to sleep for five or ten minutes, to place the foot in varus, in adduction, in such a way that the inner or concave border is raised, and then to fix it immediately in a plaster (fig. 708, 709), with which the patient is able to walk the next day.

B. **Without chloroform.** — In the case where the parents dislike either chloroform or plaster, you can still arrive at a cure.

1st. *You are able to redress the foot, proceeding as you*

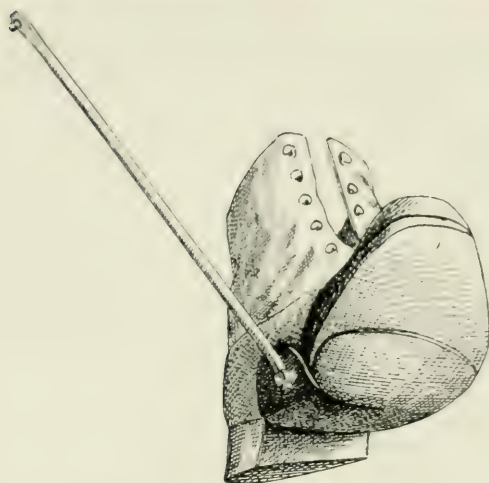


Fig. 704. — Our lever-sole adapted to a boot (view of plantar surface).

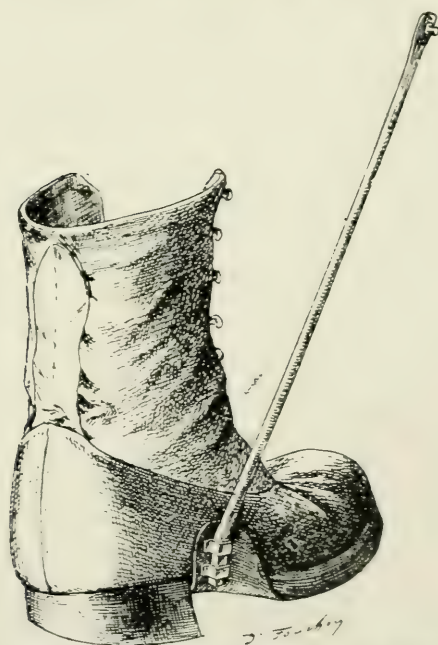


Fig. 705. — Our lever-sole, viewed on inner aspect

would in the presence of a very painful sprain; you proceed to massage the foot, at first very gently, scarcely touching it, for several minutes, in order to deaden and benumb the sensibility and overcome the spasms; then you proceed a little less gently, then more vigorously, and after fifteen minutes you are able,

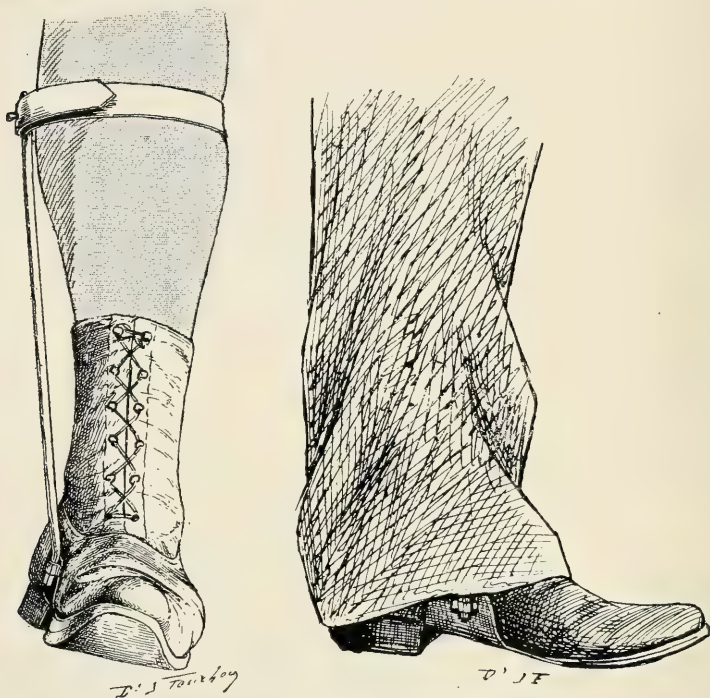


Fig. 706. — Our apparatus applied. Fig. 707. — The trowser hides the lever.

without causing pain (or with the least pain imaginable, and quite supportable by the patient), to knead it, work it and place it in varus at one stroke, or at least in a nearly correct position, postponing until the next day, or the day afterwards, at a third or a fourth sitting, the effort to obtain hyper-correction in varus.

You can make two sittings for massage each day.

2nd. *To support the foot.* — You proceed, at the end of each

sitting, to fix it with our lever, which is represented here (fig. 716 to 717), and, from the second or third day, the patient



Fig. 708. — After the manipulations, one puts on a plaster apparatus supporting the foot in hyper-correction : this apparatus ought to leave only the toes free.



Fig. 709. — Plaster seen from the back ; one strengthens with a plaster buttress the inner border of the sole, in order that the plantar surface may be perpendicular to the axis of the leg and be placed quite flat on the ground (in order to facilitate walking).

will be able to *walk* with the apparatus, placed in a suitable boot, as he would with a plaster apparatus. Plaster has this advantage, that one has no need to touch it for six weeks.

— On the other hand, the lever sole is often more favourably

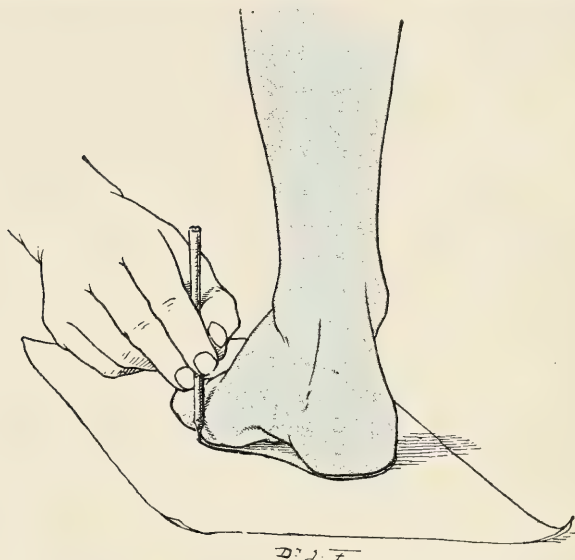


Fig. 710. — Construction of our lever sole : one places the foot on a sheet of paper and one traces the contour with a pencil.

received by the friends of the patient ; it may be changed at will ; one performs a new massage every two or three days ; in

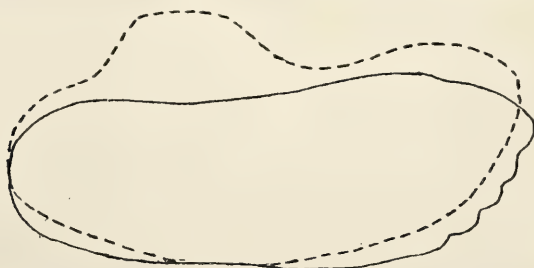


Fig. 711. — Tracing of the foot in outline. The dotted lines shew the form of the sole which will be cut out of sheet iron for the lever-boot.

the interval of the sittings the patient continues to wear the sole (that is, day and night) in order to shape the foot.

After six weeks, one removes the plaster or the lever-boot, and replaces it with an ordinary shoe with the inner border raised and slightly vaulted; to this shoe is adapted a lever of the kind represented here. With an "elephant's foot" trowser, or simply a rather wide one, and better still with gaiters, one hides the lower part of the lever very well.

The patient wears this boot, in severe cases, for a year or

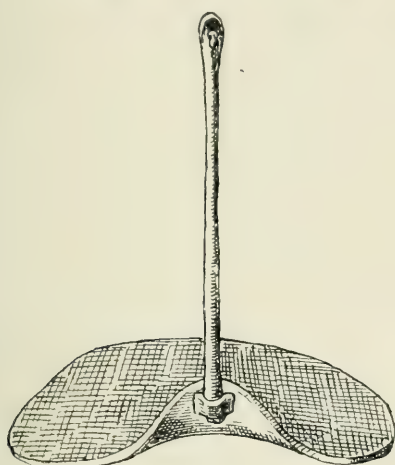


Fig. 712. — Seen on the inner surface.

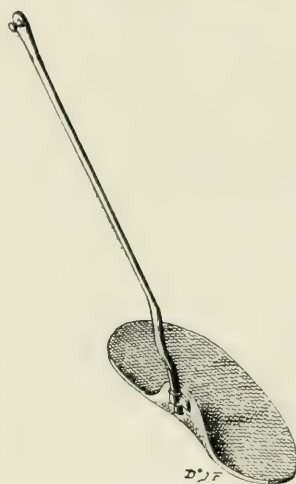


Fig. 713. — By the posterior $\frac{3}{4}$ face.

two, to shape his foot (but with this very convenient support, he comes and goes like an ordinary individual). As time goes on, the patient will wear, if need be, a shoe raised a little on the inner side.

And that is all. See how simple and accurate the treatment is.

There may be brought to you, an individual who has been completely helpless, for several months. Almost instantly, on the first day, or at least the next day, you have rid him of all his pain, and he becomes able to walk as much as he likes.

And this small miracle you will effect always, because all the cases are suitable for this treatment.

Value of Surgical Operations.

Then, as to surgical operations for the severe cases, the operations of Ogston, of Vogt, of Trendelenburg.... that is, cuneiform resections of the bones, ablation of the astragalus, etc.??... I never perform them now.

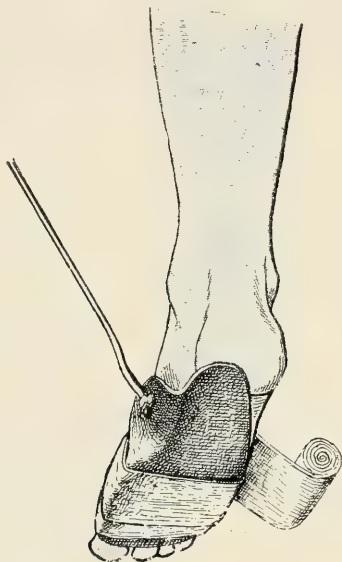


Fig. 714. — Application. One fixes first the fore part of the foot with several turns of Velpeau bandage. The heel overhangs the extremity of the instrument behind.

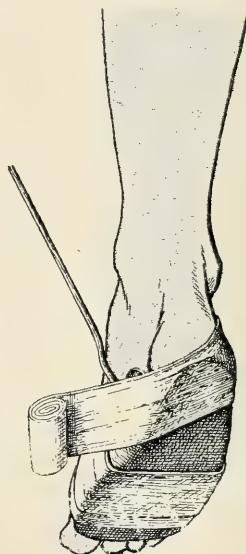


Fig. 715. — A cast of the bandage forces the heel inwards, on to the apparatus; the inner border of the foot is then found to be arched.

Formerly, I treated old standing tarsalgias with the saw or the chisel, like all other surgeons. Today, I treat the same severe cases by vigorous shaping of the foot, with or without chloroform, followed by the application of a plaster or of a lever-sole, and I cure them, not only as well, but certainly better than by my surgical operations of earlier days. I have not seen, for six or seven years, a single tarsalgia which has resisted this treatment.

The **treatment**, besides its admirable **efficacy**, presents this



Fig. 716. — The foot is intimately fixed to the artificial sole.



Fig. 717. — The lever drawn against the calf raises the inner border of the foot and replaces it in abduction.

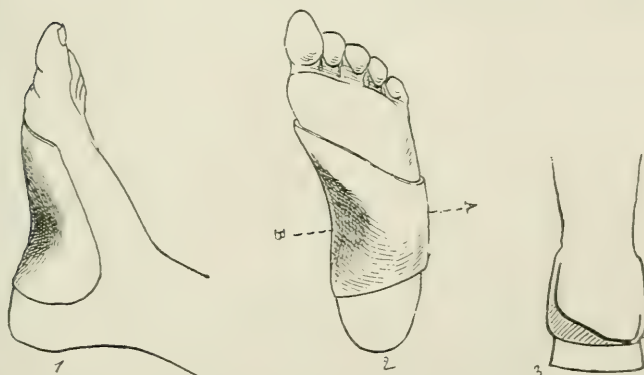


Fig. 718 and 719. — Simple steel sole (in the boot) which suffices for mild flat foot at the **beginning** : 1, inner surface : 2, plantar surface : 3, cut of the boot furnished with the artificial sole (according to A B in fig. 2).

precious advantage, that it is **very simple** and **may be carried out everywhere**, by each of you.

CHAPTER XIII

INFANTILE PARALYSIS

Before touching upon the treatment of Infantile Paralysis, we wish to mention what it is necessary to *know about electricity*: 1st, in order to make the **diagnosis** of the condition of the affected muscles: 2nd, in order to **combat muscular atrophy**, seeing that this information does not appear to us to have been anywhere set out with the precision and clearness which is desirable¹.

One utilises for this purpose the galvanic or continuous currents and the faradic or induced currents.

Apparatus employed. — Galvanic currents are furnished by a battery of cells of 30 elements (fig. 721) which can be bought with the necessary accessories, such as: a switch or rheostat to graduate the current, a milliamperemeter to measure it, an interruptor and reverser to establish it, to interrupt it, to modify its direction; tin plates and tampons covered with felt or chamois leather, serving to apply it to the patient, and some pliable wires for establishing the connexions.

The faradic currents are furnished by an induction coil (fig. 723) supplied with an interruptor which can be regulated and fed from a battery. The current of induction may be augmented or diminished at will: the induction coil ought to be of thick wire.

Method of employment. — The plates are moistened with warm water. One, very large, of from 100 to 150 square centimetres called the indifferent electrode, because it only serves to close the electric current, is applied against the middle of the patient's back, if it is a case of paralysis of the lower extremities: at the nape of the neck if it is a question of the upper limbs. It remains fixed during the whole of the sitting; the other, the smaller, of olive or spherical shape, called the active electrode, is applied over the muscles to be electrised, and

1. These few pages have been drawn up by my old assistant, Doctor Bergnat, of Argelès-Gazost, who is a particularly competent electrician.

moved about according as may be required. Once established the connexions with the extremities of the induction coil, or with the poles of the battery, taking care to establish the current *gradually*, and, in the case of the continuous current, determining *exactly the direction of the current*, the active electrode being, according to the case, positive or negative, and not having the same effects. The second electrode

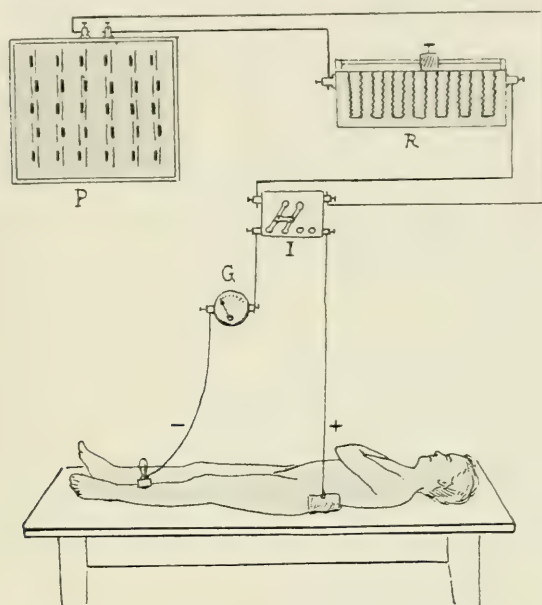


Fig. 720. — Schema of an apparatus for the continuous current and the necessary connexions for its application to the patient. The rheostat enables one to graduate the current. P. Battery of 30 cells : R. Rheostat : I. Interruptor-reverser : G. Galvanometer.

is sometimes represented, for electrification of the limb, by a trough of water into which the hand or the foot is plunged (fig. 724).

Exploration of Muscular Contractility. — For this, the strength of the currents employed should be precise, and it is necessary to localise the active electrode well over the motor points of the muscles.

In the normal state, the faradic current produces muscular contractions during the passage of the current, more or less strong according to its intensity: a series of isolated and repeated contractions if the interruptions are sufficiently slow, a sustained contraction

if the vibrations of the interruptor are rapid. The galvanic current, which has profound effects upon the nutrition of the muscles and favours their development, provokes pricking sensations, burns of the skin at the points of contact of the electrodes; *but if the current has been established gradually, without jerking, and diminished in the same way, there will be no contraction of the muscles during the passage of the current. On the contrary, if one violently interrupts the current and*

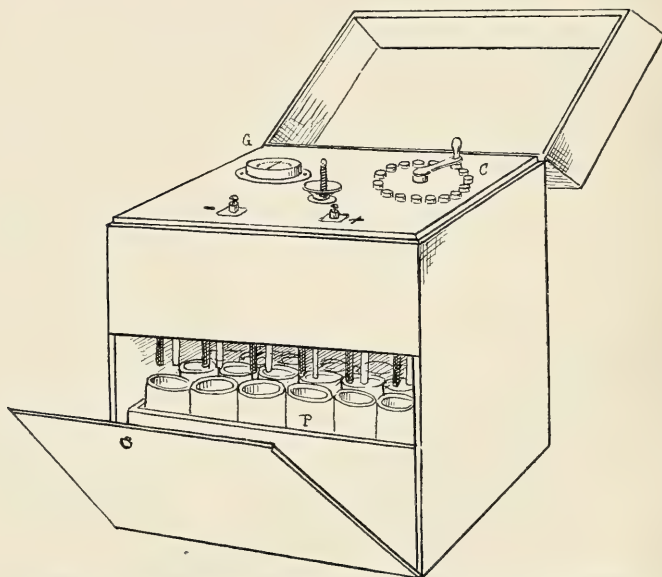


Fig. 721. — Model of a portable case with switch. G, Galvanometer; C, Collector; P, Cells.

if one re-establishes it as violently, the muscle receives at the break and at the make of the current a galvanic shock to which it responds by a lively contraction, brusque and immediate. This contraction varies with the intensity of the current, its direction, the nature of the galvanic shock received (opening or closing of the circuit). A normal relationship exists in the order of appearance of the contractions when the current is changed successively from 1, 2, 3, up to 20 milliampères and in their force for the same intensity of the current. At one or two milliamperes, the closure contraction occurs if the active electrode is negative; at three milliamperes, there is a closure contraction with the positive electrode; at 3 or 4 milliamperes one can notice the break contraction

with the positive electrode; with the negative electrode, the break contraction only shows itself if the current rises to 15 milliamperes.

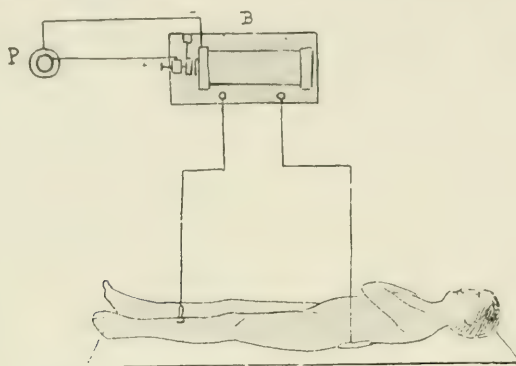


Fig. 722. — Schema for an apparatus for the faradic current and connexions. P. Cells ; B. Ruhmkorff's Coil.

With a current of from 15 to 20 milliamperes, one obtains with the two poles, indifferently at the make and break of the current, a

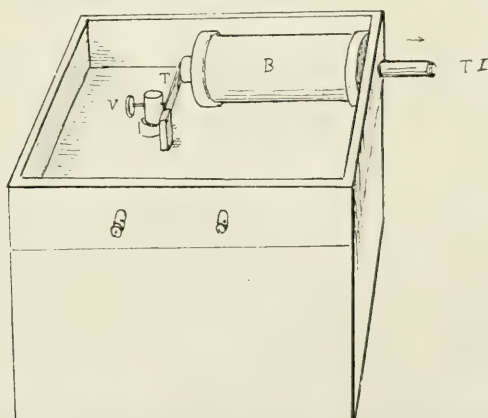


Fig. 723. — Portable Induction Apparatus. — When the tube is drawn in the direction of the arrow, the current is augmented. — B. Ruhmkorff Coil ; T Interruptor ; V. Screw of the interruptor ; T I, Secondary Tube.

contraction, but at the make the contraction due to the negative pole predominates, at the break it is the contraction due to the positive

pole which is the stronger. On the other side, the contractions produced by the abrupt make of the current are always stronger than those following the break.

As to the pathological condition : when a muscle is attacked by infantile paralysis, it does not react normally to electrical excitation. At first, it becomes less and less exci-

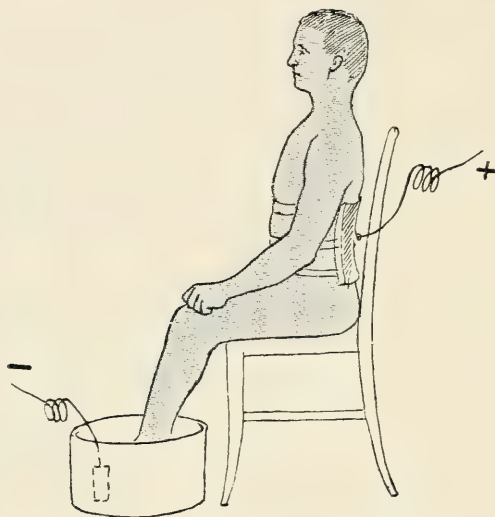


Fig. 724. — Position of the patient for application of the continuous current in the case of infantile paralysis, left leg. The electrode on the back, held by means of a bandage, is positive ; the trough of water represents the negative electrode

table to the faradic current. When the case is serious, there is no contraction with the current, whatever its intensity may be.

Galvanic excitability may then be increased or diminished, the relations between the contractions obtained remaining the same as in the normal condition.

But if this relation be modified, the muscle being found to be inexcitable by the faradic current, then there appears what is called, by Erb, the reaction of degeneration. The contraction due to positive excitation will be stronger at the closure of the circuit, than the contraction due to negative excitation. It is

the reverse of that which occurs in the normal condition: the same reversal may be produced at the break of the current. It is this disturbance caused in the normal formula of muscular responses to the galvanic current which characterises the reaction of degeneration.

On the other hand, the contraction produced, no longer shows its character of instantaneousness; it is slow, sluggish, retarded. In other graver cases, the muscle remains inert **in the presence of** the application of the faradic and galvanic currents.

Value of Electricity in Establishing the Prognosis.

From the muscular reactions one may draw interesting conclusions as to the prognosis of the disease.

I. When the muscles present only a diminution of their **contractility** by galvanism and faradism, one may hope for a **rather rapid return** (8 to 10 months) of their motility.

II. If they have become **inexcitable** to faradism, but **react** still to **galvanism** without the reaction of degeneration, the case is still **curable**, but a year or a year and a half of treatment is necessary.

III. If the muscles present the **reaction of degeneration**, one may still hope for an **amelioration** if the **treatment** is applied with **perseverance**.

IV. Finally, when the muscles **have lost all electrical excitability**, in spite of **methodical treatment** continued for **a year**, their **function** is irremediably **lost**.

Electrical treatment of paralysed muscles.

The electrical treatment of infantile paralysis may be summed up thus:

1st. **Early** intervention: two or three days after disappearance of fever.

2nd. The employment of **galvanic** currents of from 10 to 15 milliampères applied two or three times a week by means of two very wide electrodes, a *positive* plate placed over the back the other being represented by a cup full of tepid water into

which the extremity of the limb is placed. Duration of the passage of the current : 10 minutes. Take care to reach this strength of current slowly, commencing at zero at each sitting.

3rd. Produce at **the end** of the sitting some contractions by **brusque interruptions** and reversals of the current.

4th. After this treatment, which is directed to the limb, electrise, by means of the tampon electrode, **muscle by muscle**, those which are found most sluggish. Use for this the same form of current as in the preceding.

5th. *No faradic current* : one **may** employ it **in order to ascertain** from time to time the muscular reactions, that is for the purpose of diagnosis, *but it should not be applied in treatment.*

6th. Much **perseverance** is necessary on the part of the physician and the patient, for the treatment may be of long duration; when it lasts for more than a year, it is useful to allow a rest every three months.

7th. Before considering a muscle as definitely **lost** and **giving it up**, one must **see** that, in spite of the treatment employed, there is no re-appearance, for at least **a year**, of electrical reaction. (See IV, preceding page.)

THE TREATMENT OF INFANTILE PARALYSIS

I only occupy myself here with Infantile Paralysis from the orthopædic point of view. It brings about deviations and loss of power more or less serious. What is to be done?

There is no general rule to be adopted for all the patients. The course to be followed depends on each case, and the cases differ much from each other.

We will pass in review the different clinical forms which one may encounter, and point out the treatment in each of them.

The treatment may be **orthopædic** or **surgical**.

I. — PURELY ORTHOPÆDIC TREATMENT

(that which all practitioners can apply.)

A. — The Infantile Paralysis is localised in the foot.

You know that it is the foot especially which is attacked. One can differentiate three varieties :

1st. VARIETY : All the muscles of the leg are affected, — *slightly* but *uniformly* affected. — *There is no deformity.*

2nd. VARIETY : All the muscles are affected and *completely lost.* The foot is *limp.*

3rd. VARIETY : *One muscle only* — or two or three muscles only — are affected, and one has a *paralytic club foot* (produced by the predominating action of the antagonistic sound muscles).

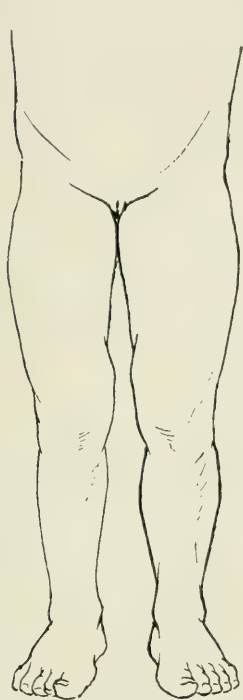


Fig. 725. — Infantile Paralysis of the right leg. All the muscles have been affected (slightly affected). There is no deformity.



Fig. 726. — All the muscles of the leg have been attacked and are completely lost: the foot is limp. The thigh is normal.

1st. VARIETY. — The child drags the foot a little and is slightly unsteady on that side in walking; when one examines it, one finds a *little weakness*, but *no deformity* (fig. 725). On comparing the limb with that of the opposite side, one finds

that its development is rather behind-hand; all the muscles are a little more flabby, a little less strong; but this diminution is *very little marked* and moreover it is spread over *all the muscles* which ensure the equilibrium of the foot and the preservation of its proper attitude.

The treatment is very simple.

Here, apparatus or operation is out of the question. The only thing to do is to strengthen all the muscles of the foot, by massage, by electricity, warm sea baths, or warm sea sand baths, or even by the baths of Bourbonne, of Aix, of Argelès-Gazost, of Salies, etc.

If there should be at the same time a shortening, one may correct it by a special heel to the boot.

2nd. VARIETY (fig. 726). — *All the muscles of the foot are affected very seriously*, entirely, or almost, **lost**; the skin is cyanosed, the **foot** is **limp** and cold. It is placed in **equinism** by the sole influence of **weight**.

Here, there is no need for hesitation.

You will redress the foot, divide the tendo Achillis if it is necessary, in order to obtain the correction. When the foot is straight, you take a mould, upon which you will make a rigid boot with strong buttresses fixing the foot in this position.

The mould taken off, you place on the foot a plaster which you leave on for four or six weeks — the time required for making the boot. This should be well padded to prevent sores on the badly nourished foot. The boot is worn during the day, and even during the night, at the beginning, until adhesions have occurred which fix the foot at a right angle.

3rd. VARIETY : **The Paralytic Club Foot.**

There exists a deformity of the foot which is produced little by little; it is nothing at the beginning, but it ends in becoming a veritable **club foot**.

It may be an equino-valgus, or an equino-club foot, or a hollow foot, or an equino-varus.

Diagnosis. — One distinguishes it from **congenital club foot** :

1st by its shape; 2nd by its history; 3rd by examination of the limb; 4th by the relative facility with which you are able to redress it.

a. *The shape.* — Whilst congenital club foot is nearly always equino-varus, the paralytic club foot is very often equino-valgus or equinus, or talus valgus, hollow foot, etc.

b. *The history.* — In paralytic club foot, the foot was normal at birth and generally the child walked well at the usual period of 12 to 14 months. At a year and a half or two years, a **fever**¹ supervened, with or without **convulsions**; the limbs were almost completely paralysed for several weeks, then the paralysis disappeared from every part, except the foot, which took, little by little, the defective shape you now see.

When you have a history so clear as this, the diagnosis is obvious. When the history is not so clear, the diagnosis is naturally less certain. It will be wise to look for other symptoms.

c. *Examination of the patient.* — If it is a question of a paralytic club foot, you may find signs of infantile paralysis in the foot or leg, namely: foot less warm or even cold, skin more or less rosy or even violet on that side, which is evidence of a defective nutrition; the musculature of the leg is more flabby, owing to lack of contraction of certain muscles; in a word, you are in the presence of a paralysis, or of a paresis, of one or several muscles, of a manifest atrophy either of the leg, or even of the whole lower limb.

I know, however, that in congenital club foot, there is a slight amount of atrophy but to an incomparably less degree: the muscles are always much stronger and more resistant.

d. *Easiness of Redressment.* — This is again a very valuable diagnostic point, so much so that one is able to establish, as a general rule, that a club foot of six, eight, ten years standing, which one is able to redress in eight or ten minutes, is not a congenital club foot. That, at this age, will require for its correction, three quarters of an hour of vigorous manipulations.

The Treatment of Paralytic Club Foot

1st degree. *Simply a tendency to a bad position.* — There exists, so far, only a tendency to deformity; but, if nothing is done, this slight tendency may run one day into the very marked deviations which are represented in the figures from 769 to 772. — The only harm done so far is the wasting

1. Most generally at night time.

of a single muscle which the paralysis has slightly affected.

It seems that, if we were able to assist this slightly weakened muscle, we would re-establish the equilibrium and make sure of the future. And, really, we can do this by supplying the child with an *artificial muscle*. This expression must not alarm you! There is nothing more easy to do, as you can see by looking at the model represented here of an artificial muscle which I have had made by the mother of one of my little patients (fig. 727 and 728).

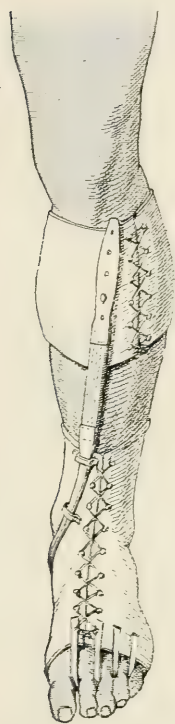


Fig 727. — Artificial tibialis anticus.

If the foot has a tendency to be carried slightly outwards and in extension (slight equino-valgus), it is nearly always due to a paresis of the anterior muscle of the leg. One can **ascertain** this by comparative electrification with the opposite side; or, more simply, by inducing the child to make the movement peculiar to the muscle, namely, to place the foot inwards and to bend it on the leg, whilst one palpates the muscle and compares it in every way with the anterior muscle of the other leg.

It is manifestly weaker than that. It is then desirable that we should help it with an «**artificial muscle**». This is a canvas gaiter, to which one attaches the two extremities of the artificial tibialis anticus, giving to it the attachments and direction of the real muscle. It is composed of an **elastic body** (simply 2 or 3 folds of elastic webbing fastened by a few stitches: the body is not fixed to the gaiter and is able to move over it) and of two **rigid extremities** (cords or tapes, representing the tendons and stitched to the gaiter opposite the natural points of insertion of the muscle (below, opposite the inner side of the internal cuneiform bone, and above, opposite the external tubercle of the tibia), and there we have our artificial muscle made.

There are certain peculiarities to point out in its construction. Below, the gaiter encloses the extremity of the foot like a sock, and above it rises up to a point above the knee or is fixed to the waistcoat by a garter. This double arrangement

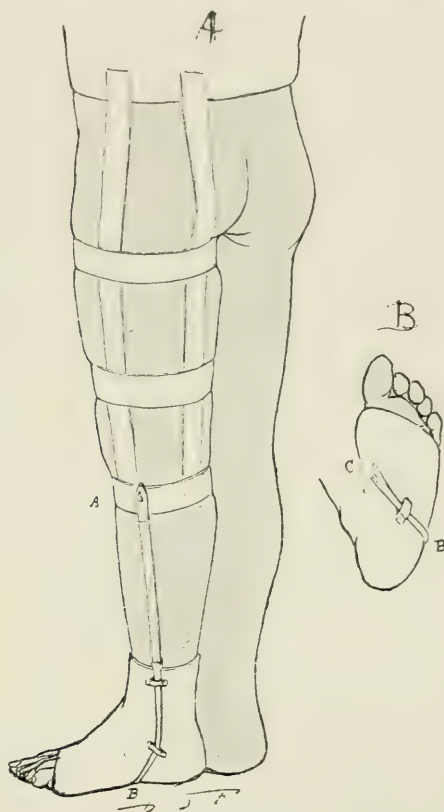


Fig. 728. — Artificial peroneus longus.

prevents any sliding, it prevents the twisting of the two ends of the gaiter (which would be brought about, without that, by the traction of the elastic part). Strictly speaking, one can do without the real gaiter by simply placing, opposite the fleshy body of the muscle, a portion of elastic webbing carrying at its

extremities two canvas thongs passing upwards and downwards the length of the limb and attached opposite the articulations by bands of the same canvas, real annular ligaments and flexion pullies : the upper attachment will be the garter, the lower attachments, two small cords passed between the toes.

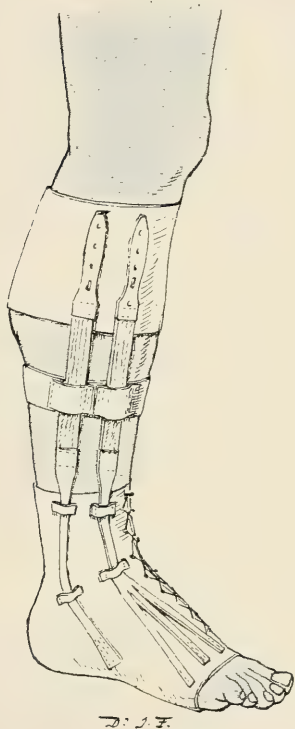


Fig. 729. — Artificial extensor communis digitorum and peroneus tertius.

There are some children who do not tolerate the two cords over the toes. In that case, be content with tightening behind, but very near to the toes, the annular band of canvas, so that it may not be turned over by the traction of the artificial muscle, or, still better, use the entire lower end of an ordinary sock.

This (fig. 727) is the artificial muscle which helps the paralysed tibialis anticus; the case of a foot in which the point goes a little outwards and downwards (slight equino-valgus).

To help the peronei (the case of a foot going inwards), the muscle will have the arrangement represented (fig. 728).

To assist the extensor communis digitorum (the case of a foot in slight equinism and slight adduction; see fig. 729) the artificial muscle is to be worn almost constantly, during walking and even when resting at night. It is no more uncomfortable than an ordinary stocking.

Here is the **degree of tension** to give an artificial muscle : it is necessary that, when the foot is at rest, the muscle, taking the place, for instance, of the tibialis anticus, should place the foot in slight varus with flexion on the leg, that is to say, in

a position rather the reverse of that which the foot has a tendency to assume. And thus, when the foot is moved, the *tibialis anticus*, being partly paralysed, but assisted by its artificial supplement, is doing its utmost.

If, however, you are unable to rely on the entourage of the child, or if you have not succeeded in obtaining a satisfactory result in this way, because the muscle is already too much affected, you will treat this first degree of deformity in the same way as the next one, that is to say, you will have made for the child a rigid articulated boot, the joints of which will prevent the lateral movements and limit its extension beyond a right angle (v. fig. 735).

2nd degree of Paralytic Club Foot. *The paralytic club foot is clearly and distinctly established.*

One ought : 1st to redress it ; 2nd keep it redressed.

Redressment of a Paralytic Club Foot.

One manipulates in identically the same way as for a redressment of congenital club foot (v. Chap. xv).

In « disentangling » and successively correcting the different factors of the deformity, one arrives generally, after 8 or 10 minutes, at a very satisfactory result : but one does not stop until one has obtained a hyper-correction of at least from 15° to 20°.

I said that you would be astonished at the facility with which the foot allows of redressing. One may even redress it without anæsthesia, at two or three sittings, made at intervals of 8 days.

Nevertheless, a tenotomy is sometimes indicated in order to achieve the correction. Thus, in the case of equine club foot : if, at the end of the sitting, the correction of the equinism be still incomplete, you feel the *tendo Achillis* strongly resisting ; instead of tearing it away by a very considerable effort, — which might be possible, strictly speaking, although you would probably tear away some pieces of the *os calcis* in doing so — you may divide or elongate the tendon.

Indications for dividing or elongating (fig. 730).

One ought to divide, when it is merely a question of obtain-

ing a lengthening of 1 cm. and a quarter in a child, or of two and a half in an adult, because nature may fill up this amount of separation. But, if you ought to obtain more than that, you will perform elongation of the tendon.

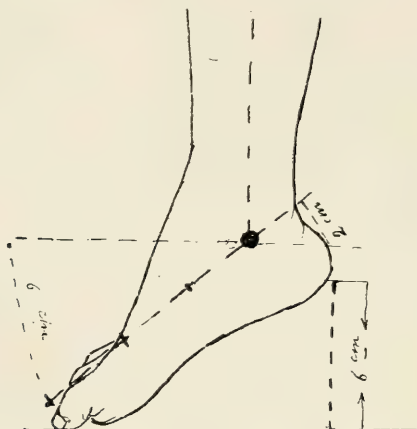


Fig. 730. — The necessary lengthening of the tendon is equal to a third of the distance separating the heel from the ground. Here this distance is 6 cm. The tendon must then be lowered by 2 cm. But as, in the child, a growth of only 1 cm. takes place after tenotomy, it is necessary in this actual case to perform the lengthening of the tendon and not a simple tenotomy.

a) Sub-cutaneous section of the tendo Achillis

Instrument : a tenotome or a narrow bistoury.

Ordinary precautions and minute asepsis.

Make the patient lie on his abdomen, so that the tendon may be easily seen and felt. Direct the assistant to flex the foot slightly, in order to throw the cord of the tendon a little into prominence.

You divide the tendon (fig. 731 and 732) two centimetres above its insertion into the os calcis, entering from within outwards so as to be quite certain of avoiding the bundle of vessels and nerves. Finally, divide the tendon from its deep to its superficial surface.

1st. With your index finger or your left thumb, invaginate the skin from within outwards under the deep surface of the tendon, which is, for the moment, relaxed.

2nd. Conducting over your finger-nail your fine bistoury,



Fig. 731. — Division of the tendo Achillis. The left thumb depresses the skin under the tendon to protect the deep organs and to serve as a guide for the tenotome.

flat, you puncture the skin in this fold, and thus you penetrate directly up to the level of the external border of the tendon.

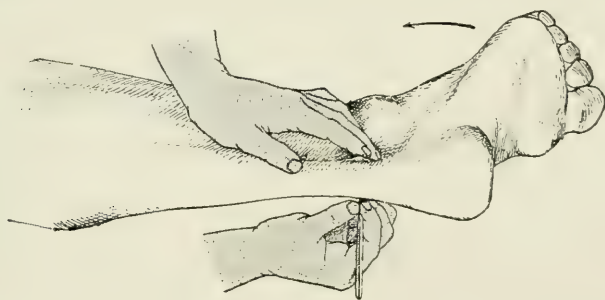


Fig. 732. — Tenotomy (continued). The blunt tenotome, passing under the tendon, makes a prominence beneath the skin on the outer side. The left hand fixes it in this position; an assistant makes gradual flexion of the foot, following the direction of the arrow. and the tendon cuts itself against the sharp edge.

3rd. You then remove your left index finger, and the invaginated skin returns upon itself.

4th. After that, you turn the edge of the bistoury round to attack the deep surface of the tendon.

5th. At this moment, you direct the assistant to flex the

foot, more and more forcibly. The tendon in this way cuts itself against the sharp edge, gently, slowly, millimetre by millimetre, until you have attacked the superficial fibres (subcutaneous). The tenotome should always be held in such a way as not to pierce the skin. For greater security, you may also raise the skin with the left index finger and thumb, whilst the section is made.

In a moment, even before you have withdrawn the bistoury, a sharp separation of the two fragments of the tendon is suddenly produced (generally) or else the separation is effected by degrees.

If this does not occur when your tenotome has arrived under the skin, you will nevertheless withdraw it, and press on the small wound with a tampon, to arrest any hæmorrhage. Whilst you are pressing thus, you direct your assistant to flex the foot further with his two hands and with a **smart and vigorous stroke** (« le coup du malin »).

This manœuvre ruptures the fibres which have escaped the knife, and you will feel that the tendon is loose. The redressment of the foot is then obtained as completely as you wish.

You place a slightly compressive aseptic dressing over the small wound; and over all you apply a plaster which fixes the foot in a hyper-correction of from 15° to 20° ; it is thus flexed on the leg to 70° or 80° .

b) Elongation of the tendo Achillis

You perform this elongation by the open method, or by the **sub-cutaneous route**, in the very simple manner you see here (fig. 733 and 734).

1st. You push in a fine bistoury over the median line of the tendon and at about 6 or 7 cm. above its inferior attachment. And you divide its **external half** from within outwards.

2nd. Then you remove the bistoury and carry it much further downwards to a centimetre and a half only above the attachment of the tendon; you enter in the median line and divide, this

time, the **internal half** of the tendon, from without inwards.

3rd. This done, you **gently raise** the point of the foot and you **feel**, as it is straightening, **the two halves** of the tendon **glide gently** one over the other until you acquire the elongation desired.

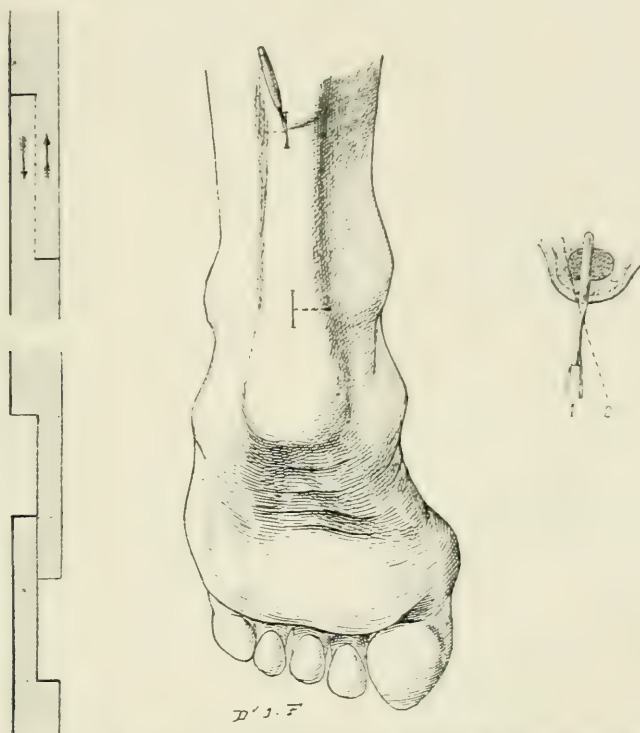


Fig. 733-734. — Method of performing elongation of the tendo Achillis (see the text)

If you have never performed elongation, try, for the first time, the open method. In the operation by the open method, one rejoins by one longitudinal median incision the two transverse incisions. One sutures afterwards the two extremities of the two small tendinous tongues with catgut, then the skin with catgut in the same way.

One fixes the correction in a plaster (as after tenotomy).

The plaster is left in position for three or four months. But, with the plaster, the child will be able to walk when the foot is no longer sensitive, that is, 6 or 8 days after the redressment.

At the end of the four months, the plaster is removed and the foot set free.

Preservation of the Redressment.

The foot is corrected and even over-corrected for the moment. What remains to be done? — That depends on what is going to happen.

a) It happens, in some **favourable cases** of club foot, that the foot **remains straight**¹ after leaving off the plaster (without any assistance).

As long as the deformity existed, the stretched muscles were unable to do anything, for their action was wasted in wrestling (ineffectively it is true) against the deformity. When this is corrected, or even slightly over-corrected, and when, besides, the points of attachment of the muscles are approximated, the **action of the muscles may return sufficiently** to balance their **antagonists** which are on the **contrary rather the weaker**, having been elongated by over-correction.

To improve them, you massage the muscles, formerly stretched, now contracted, you electrise them, you make them perform active movements.

Improve them still more if need be with an artificial muscle, which, insufficient before the redressment, may not be so now.

b) But, **most often**, you will see that this treatment is **not sufficient**; it will not prevent the foot returning to its bad position, because, after as before the operation, the groups of muscular antagonists will remain very unequal². After a few

1. In the case where the antagonistic muscles are almost equally strong, and where the deformity is only produced because the posterior muscular group has returned more quickly to life than the anterior, after the attack of infantile paralysis.

2. It was on account of these inconveniences, produced by the inequality of the different groups of muscles, that Duchenne (of Boulogne) said : “ It

days or a few weeks have elapsed since the plaster was left off, if you see that, in spite of massage of the artificial muscle, the correction obtained is not preserved, if the foot resumes its old direction, make haste and recapture it. Redress it immediately, which this time is quite easy, and take a mould in the good position, in order to have a **jointed boot** made, which boot will prevent side movement and extension beyond a right angle (fig. 735). The mould removed, you fix the foot in the right position by a small plaster, which you leave on for the time necessary for the making of the boot.

With this boot, I dare not say that the lameness will entirely disappear, but it will at least be greatly diminished.

Take note that this boot may be **easily made anywhere**, at a price which will certainly not exceed the resources of the most humble, seeing that it is sufficient to take two metallic shanks with an articulation with limited play, and to make an ordinary boot on this armature.

In other words, you have only to place in the interior of an ordinary boot the appropriate armature; to **clothe** with leather this kind of metallic stirrup.

If there is shortening, one orders a heel-piece (see p. 479, the boots for coxitis).

would be better to lose all the muscles of the foot than one only of the most important of those muscles".

But we shall see further on that, for those who wish and know how to perform tendon transplantations, it is no longer true, and that the result of operation will be the more beautiful according as the foot has lost fewer muscles.

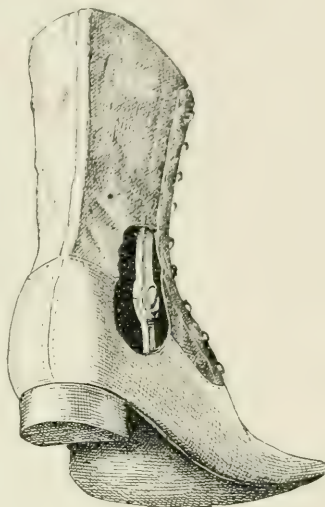


Fig. 735. — Articulated boot permitting flexion only within or beyond a right angle (according to the case).

It is necessary to say that boots articulated or rigid are not always well borne¹ and that by the always predominating action of the sound muscles, it is possible for abnormal pressure to be produced on certain points, setting up callosities or even excoriations.

B. — Paralysis occurring about the Knee or about the Hip.

If one is dealing with another segment of the limb than the foot, namely, with the knee or the hip, one can distinguish three varieties on all fours with the preceding cases, and the course to follow is evident, after what we have said with reference to the foot.

1st. VARIETY. — If there is *almost no paresis*, and *no deformity whatever*, one endeavours simply to strengthen the affected part : massage, electrification, baths, etc.

2nd. VARIETY. — *The articulation is loose.* — If it is the knee, you will prepare a rigid knee support in celluloid reaching from the trochanter to the malleoli; if it is the hip, the small apparatus for coxitis (v. p. 421).

It is most advantageous, in these two cases, to cause the patient to wear a large apparatus (from the umbilicus to the toes); rigid at the knee and articulated at the hip and the foot, if the knee only is affected; articulated at the knee and rigid at the hip, if it is the latter which is affected.

The **apparatus** should be as light as possible, **in celluloid**.

3rd. VARIETY. — *a)* If the *deformity is scarcely visible*, and if one muscle only is affected, one has *recourse* to an artificial muscle, although its use here is less convenient than at the foot. It is more difficult to attach it to a pair of drawers than to a gaiter.

b) If the *deformity is evident*, one performs a correction, or, rather, a hyper-correction, in the way described for the deformities in coxitis or in white swelling of the knee (Chap. vi and vii).

At the knee, section of the contracted tendons of the ham will be sometimes (very rarely) indicated.

1. See Note 2 at the bottom of the preceding page.

Section of the Tendons in the Popliteal Space.

In reality, in order to redress a deformity of the knee which is affected with infantile paralysis or tuberculosis, **orthopædic manipulations alone will nearly always be sufficient.**

Personally, it has not happened to me to divide the hamstring tendons, on an average, once a year.

You know, in any case, that it is easy, simple, and harmless, to cut them either by the open method, or by the *sub-cutaneous route*.

For the muscles on the inner margin of the popliteal space this

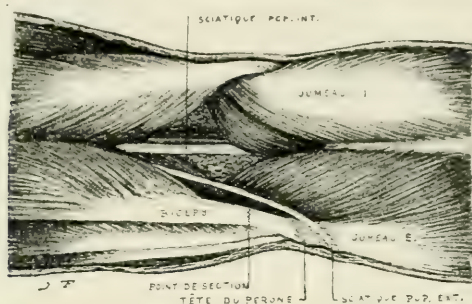


Fig. 736. — (See the text.) — The external popliteal nerve is in intimate relation with the *fleshy* barbs which unite with the tendinous cord, but not with the latter, from which it is separated by more than a *centimetre and a half*.

is evident, but it is equally true for the biceps, in spite of its being so near the external popliteal nerve.

One does not find these relations clearly set forth in books on anatomy. Here they are (fig. 736) from our own dissections.

At its lower part the biceps is composed of **two parts**: one **external**, rounded into a **tendinous cord**, **hard and slippery** under the finger: the other, **internal**, **fleshy**, spread flat and uniting with the preceding cord like *the barbs of a bird's feather to the quill* of the feather.

The nerve is found in contact with the internal fleshy part and is always separated from the tendon itself by a distance of nearly 2 cm. So much so that, by carrying the tenotome against the **internal border of the tendon**, parallel to it, in the space between the tendon and the fleshy part, one is sure to avoid the nerve.

Technique of this Tenotomy.

1. Place the left index finger flat upon the tendinous cord.
2. You press over the internal part of the tendon in order to allow

it to glide gently outwards (fig. 737) **like a ball** : owing to this gliding, the nail of the index finger corresponds to the inner border of the tendon with which it keeps in contact.

3. Over the back of the finger nail (fig. 738) you conduct the tenotome, the blunt edge inwards, the cutting edge outwards.

4. Inclining the handle slightly backwards and inwards (at an angle of about 15°), you pierce and penetrate for 2 or 3 centimetres.

5. Cut the tendinous cord slowly, from within outwards, and from

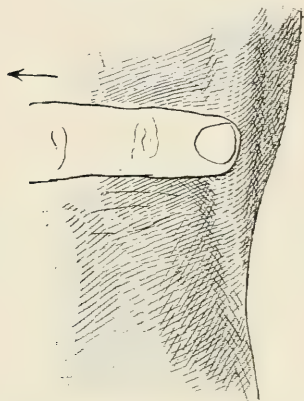


Fig. 737. — One presses on the tendon of the biceps, then, moving the finger slightly inwards, the tendon glides outwards, *without losing contact with it.*

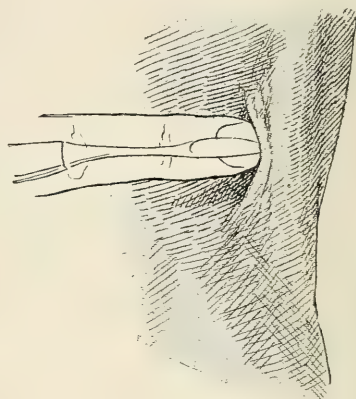


Fig. 738. — Then one conducts the fine bistoury on the finger nail, nearly level with the internal border of the tendinous cord : one is always sure of avoiding the nerve. Then one cuts from within outwards and from the depth to the surface.

the depth to the surface. With the index finger and the thumb of the left hand, you raise the skin in order that it may not be wounded by the tenotome.

The division of the tendon being made, **one is not concerned at all with the internal fleshy portion.** One withdraws the tenotome and places a tampon over the opening. One compresses, and directs the assistant to extend gradually and slowly the leg which has been bent back. **By this movement of extension, the fleshy fibres stretch themselves out, then they are broken** (as in torticollis [see Chap. xvi], the fibres which escape the bistoury give way).

One cuts the tendon **3 centimetres above the interline** of the knee.

(The tendon is felt very distinctly and easily at the external part of the popliteal space, through the clothing; practice making this palpation on yourself, **the leg semi-flexed**. One feels it especially easily when the biceps is contracted, the knee flexed).

You see how this technique is carried out and without danger to the nerve; that is why I recommend sub-cutaneous tenotomy to you rather than open tenotomy which necessitates a long incision; and the wound which gapes during the manipulations of the redressment may, perhaps, become infected, so that this tenotomy, the open one, is on the whole less simple and harmless than the other.

On the inner side of the popliteal space, the sub-cutaneous section of the tendons is easy.

It also is done 3 cm. above the interline. The technique is copied from the preceding one. The tenotome, resting on the nail, is carried close to the external side of the first tendon, the semi-membranosus. Divide it, then the semi-tendinosus and the tendon of the gracilis and lastly, if need be, divide also the sartorius tendon.

The correction is maintained by a plaster worn for 4 or 5 months. Sometimes it is spontaneously preserved after the removal of the plaster. Should it not be so, you would make a stiff knee-piece.

C. — **The whole of the lower limb is affected, or even both sides are wholly affected.**

Only the large celluloid apparatus can be of any use here; the apparatus takes its support from the ischium and *the patient walks like a man whose thigh has been amputated*.

Your part consists in redressing the legs in one or several sittings, with or without tenotomy, with or without anaesthesia, according to the case; then, when the legs are straight, quickly take a mould of them and fix at once the correction in a plaster for 4 or 5 weeks, the time required by the orthopœdist to construct the celluloid apparatus.

D. — **Paralysis of the upper limb.**

You will act in the same way as for infantile paralysis of the lower limb.

It is possible to make an artificial muscle to do duty for the extensor of the fingers, etc.

II. — SURGICAL TREATMENT OF INFANTILE PARALYSIS.

In the preceding pages I have endeavoured to give you a practical method easy for you to follow, without having recourse to a surgical operation. for I do not call the *sub-cutaneous* section or lengthening of the Achillis tendon a surgical operation.

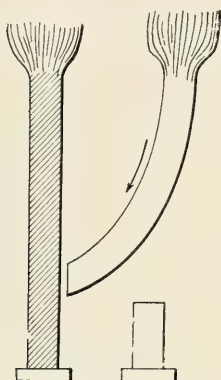


Fig. 739. — Total transplantation.

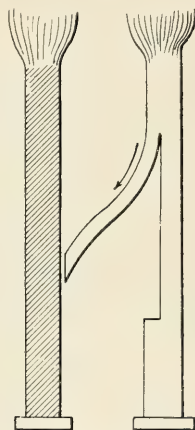


Fig. 740. — Partial transplantation.

But you are a surgeon and you object that it is *not practicable* for poor children, and even for rich ones, to wear the apparatus all their lives, and you ask me if modern surgery has not found the means of avoiding those articulated or rigid safeguards for ever. I reply to you : Yes, we have to day a relatively simple means of re-establishing, even in the worst case, the shape of the limb and of fixing it in its correct position, that is, of escaping the obligation to wear an apparatus always.

Even better, we have the means of recovering not only the shape, but also the functions, I dare not say normal, but nearly normal functions of the affected joint, in a **certain number of cases**, in the cases where one muscle alone is lost, but in a lesser measure

when two or three muscles are in a state of paresis or paralysis.

The surgical, operative treatment of infantile paralysis is here in a few words.

a. It is, in the second case studied above, that of a *limp articulation*, the stiffening of the joint either by the soldering of the articular surfaces (*arthrodesis*) or by the fixation of the tendons of the paralysed and degenerate muscles to the periosteum, or to the bones, or to the aponeuroses, in order to thus transform these tendons into veritable ligaments (*tenodesis* or *fasciodesis*), or by the two proceedings in conjunction, **arthrodesis and fasciodesis**.

b. It is, in the third case, of a *paralytic deformity*, where there are only two or three muscles paralysed, the making of a **muscular graft**, a **tendinous anastomosis**, by transplanting the whole of a neighbouring sound muscle (fig. 739), or better, of part of it (fig. 740), upon the tendon of the paralysed muscle; or even by transplanting upon the tendon of the lost muscle a healthy muscle far removed, should it be an antagonist of the muscle paralysed (fig. 741); in which case, at the same stroke, one strengthens muscles too weak, and one weakens muscles too powerful. In a word, one calculates the plan of operation in such a way as to *re-establish the shape of the limb and the equilibrium and harmony between the different groups of muscles*.

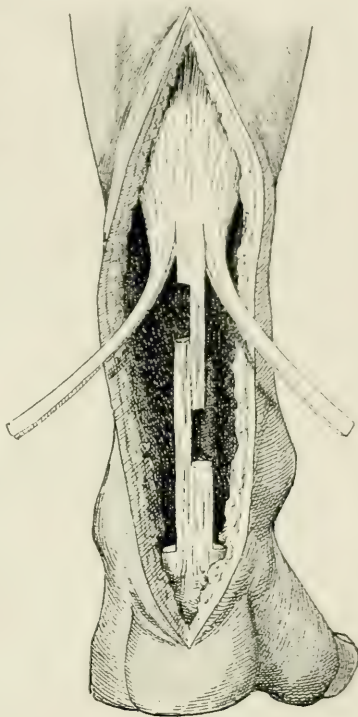


Fig. 741. — Tendo Achillis elongated and from which one has detached two lateral strips in order to transplant them upon the anterior tendons on each side.

I have performed a good number of these operations, but there is

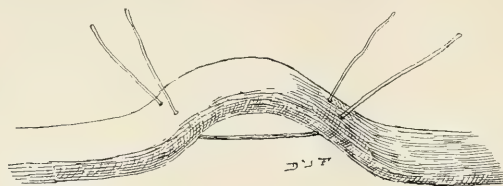


Fig. 742.

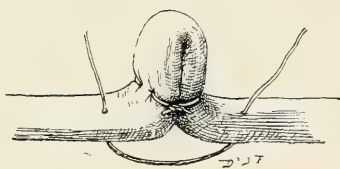


Fig. 743.

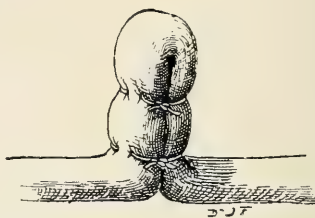


Fig. 744.



Fig. 745.

Fig. 742, 743, 744, 745. — The method of shortening a tendon which is too long.



Fig. 746.

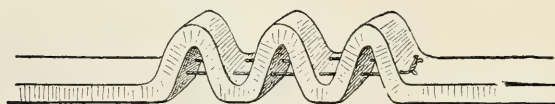


Fig. 747.

Fig. 746, 747. — Method of producing shortening by wrinkling.

a surgeon who has performed more than anyone else in the world. That is **Professor Vulpius** of Heidelberg. I have asked him to write

for **your information** the chapter on the surgical treatment of Infantile Paralysis.

He has consented with a good grace and with a willingness for which I desire to thank him.

Here, just as he wrote them, without my altering a single word, are several substantial pages, clear and practical, in which he points out the rule of conduct to be followed in order to carry out these delicate operations.

Surgical Treatment of Infantile Paralysis.

In examining a limb previously attacked by infantile spinal paralysis you may ascertain *three different conditions* of the muscles which offer you an opportunity of operating on the muscles themselves, on the tendons, on the articulations; *shortening, elongation, and loss of function.*

1st Treatment of Shortening. The unilateral traction of a group of surviving muscles in a case of partial paralysis of the musculature of an articulation, or the continued vicious position of an articulation totally paralysed, have their origin, as you know, in a nutritive shrinking of the muscles of which the points of insertion are firmly approximated. Under such conditions you see developed the paralytic deformity of the soft parts at first, later on of the bones. How can you, in such a case, obtain lengthening of the tendon? The most simple means is sub-cutaneous or open tenotomy, of which a technical description is not in my province. You perform this small operation by relying upon the reparative force of nature which will interpose a portion of tendon between the two retracted ends of the divided tendon. That comes about certainly in a small separation, that is, in one of 1 cm. in children or 2 cm. in adults. If it should exceed this amount, I advise you to have recourse to plastic elongation. Allow me

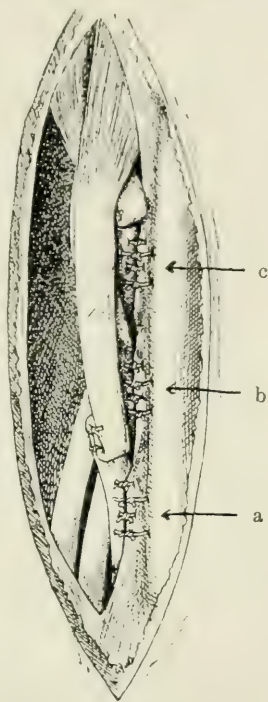


Fig 748. — At the points where they are sutured to the superficial aponeurosis, one sees that the three tendons have been previously shortened by folding. a. tibialis anticus. b. extensor proprius. c. extensor communis.

to explain, by the example of the retraction of the tendo Achillis, how you ought to practice this plastic method.

The tendon, laid bare, is divided by a longitudinal and sagittal inci-

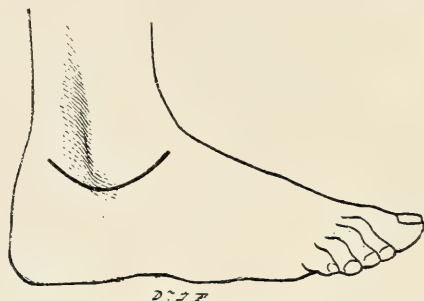


Fig. 749. — Incision for arthrodesis of the ankle.

sion corresponding to the elongation desired (see above, fig. 733 and 734). You accomplish the division by adding two lateral incisions in

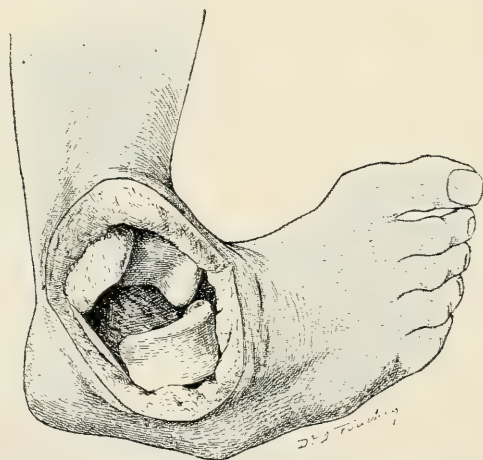


Fig. 750. — Arthrodesis of the ankle. Luxation of the foot inwards and opening of the articulation.

a contrary direction, at the two ends of the first incision. In correcting the vicious position, the two parts of the tendon slide over each other and are placed end to end; they are fixed in this position by two sutures of silk.

You may vary the operation by cutting the tendon in front.

You may also make use of the same method (sub-cutaneous) in making only two small lateral incisions and finishing the longitudinal separation by forced redressment. Or, more simply still, you cut the tendon across, as high as possible, where it is still largely in contact with the belly of the muscle, and you make it slide as much as is necessary, without entirely interrupting its relation with the muscle. Supposing you have made a simple tenotomy by mistake, or that the

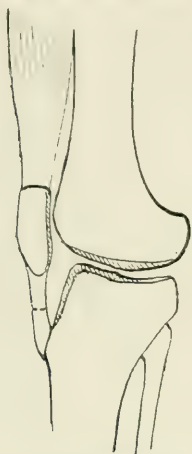


Fig. 751. — Arthrodesis of the knee. One refreshes the articular surfaces of the patella, of the femur, and of the tibia, and one cuts the patellar ligament in order to bring about shortening.

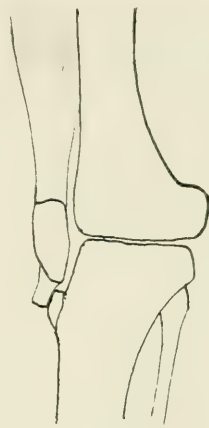


Fig. 752. — The refreshed surfaces placed in contact. Shortening of the patellar ligament.

plastic strips are very short, and you find yourself *vis à vis* a separation, what do you do then? You insert an artificial tendon of silk by passing some threads, not too delicate, from one extremity to the other, to ensure the continuity of the tendon.

By any of these methods you can be sure of obtaining an absolutely satisfactory and durable result.

^{2nd} *Treatment of Elongation.* — You find elongation, that is, hyper-extension of a muscle, as a sequel of a paresis, or of a complete paralysis.

You see, for instance, the three anterior muscles of the leg in this state of hyper-extension when they are so seriously enfeebled that the weight of the foot overcomes their contraction, you then see the equine foot. You see perhaps, slight contraction, voluntary or cli-

cited by the electric current, but quite insufficient for their function.

Later, even these slight remains of muscular activity disappear through continuous hyper-extension.

Then, what is to be done to obtain sufficient shortening of the muscle and of the tendon necessary for the normal function?

You may employ the method of *overlapping* or that of *wrinkling*.



Fig. 753. — Arthrodesis of the knee. Opening of the articulation.



Fig. 754. — The tibia is already deprived of its articular cartilage. The curette engaging the cartilage of the condyles of the femur.

You will understand more easily, by examining the figures on p. 686, than by a long explanation, how the margins of the tendinous folds are re-united by sutures, or how one fixes the extremity of the fold on to the tendon (fig. 742, 743, 744 and 745).

In order to wrinkle the tendon, you pass a thread of silk in the length of the tendon, you pull on both ends like the strings of a purse, and by that you wrinkle the tendon at will (fig. 746 and 747).

If you apply one of these methods in the case of equinus, referred to above, you will at once arrive, by shortening the three muscles, at a correction of the deformity, and in cases as favourable, at a return

of the functions of the muscles, *tibialis anticus*, *extensor proprius pollicis* and *extensor communis digitorum*.

In other cases you will find some of the muscles mentioned, *totally paralysed*. There, the operation for shortening is useless. The fleshy parts of the muscles being degenerated, are elongated again, under the influence of the weight of the foot, and produce a return of the deformity. In that case, you perform an operation, which one calls *tenodesis* (fig. 748). Ignoring the degenerated muscles, you fix the three tendons (with the tension necessary for the correction of the position of the foot) to the refreshed periosteum of the two bones of the leg, and, as I have often done, to the fascia of the leg (*fasciodesis*).

By this means, you transform the tendons into accessory ligaments.

We are going to speak directly of the combination of this tendinous operation with arthrodesis.

3rd *Treatment of the Loss of Function.* a. — A complete paralysis of all the muscles of an articulation produces, as you know, the **loose joint**, which may render the entire limb useless. In such cases, you can produce artificial ankylosis by the operation of Arthrodesis. To **ankylose the ankle joint**, you proceed in this way :

Opening of the articulation by an incision passing round the external malleolus (fig. 749), luxation of the foot inwards with or without incision of the peroneal tendons (fig. 750), free and irregular refreshment of all the articular surfaces so as to produce ridges penetrating the cartilages and denuding the bone here and there. Add, if you like, a metallic suture between the tibia and the os calcis. Complete the suture with Florence horse-hair.

A light dressing and a plaster. Exact apposition for three months at least.

You will find after removing the plaster complete ankylosis, most often fibrous, of the joint, a result which you may complete by *tenodesis* of the three anterior tendons described above.

To cause ankylosis of the knee, you open it by an anterior flap,

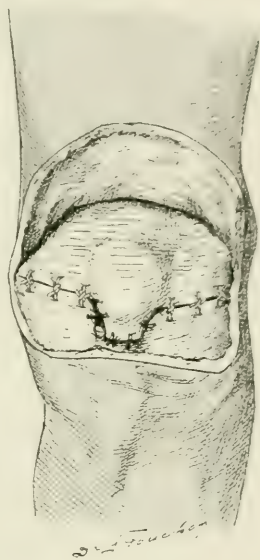


Fig. 755. — Suture of the tendon.

you make a very sparing resection, refreshing also the patella (fig. 751, 752, 753, 754 and 755). You join bone to bone, make the suture of the extensor apparatus very exactly, so that it ought never to become loose. You add a tenotomy of the

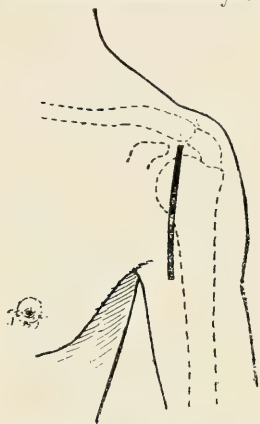


Fig. 756. — Arthrodesis of the shoulder. Incision.

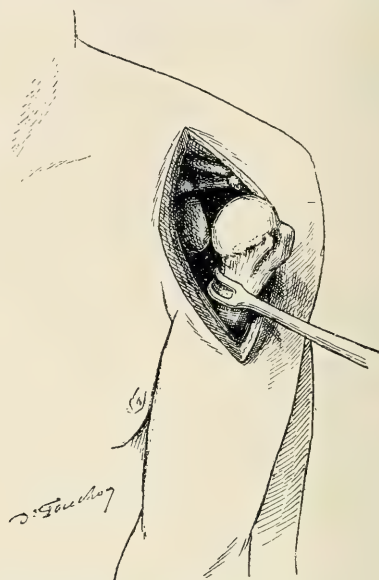


Fig. 757. — Arthrodesis of the shoulder (continued).

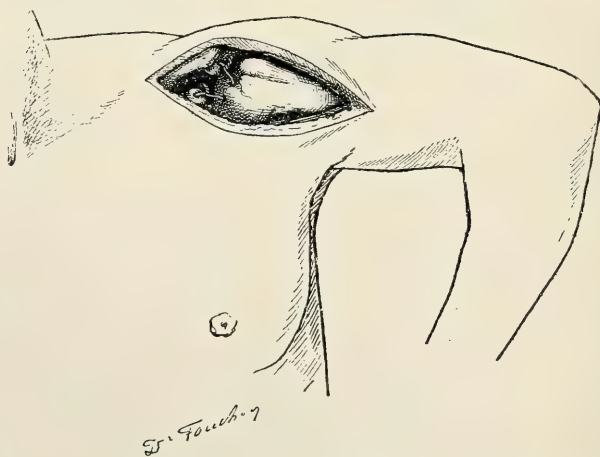


Fig. 758. — Arthrodesis of the shoulder (continued). Metallic suture of the two bones.

flexors, to avoid, later on, contracture of the knee in flexion.

After three or four months' fixation in a plaster dressing, there



Fig. 75g. — Active elevation of the arm rendered possible by arthrodesis of the shoulder.

will result, in most of the cases, an osseous ankylosis which it is

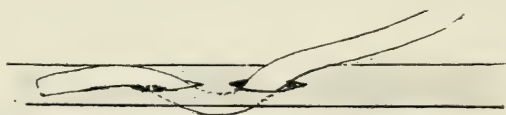


Fig. 76o. — Passage of the tendon through the button-hole.

necessary to support for some months at least, with a leather case.

Do not entertain the idea of arthrodesis of the hip joint, a very

grave operation, of which the technique and the results are not very clear.



Fig. 761. — Position of the Esmarch's bandage: below, the track of the two internal and external incisions.

You may, however, be certain of **remarkable success in arthrodesis of the flail-like shoulder**, if the muscles of the arms and fore arms are intact.

A longitudinal incision opening the articulation, luxation of the

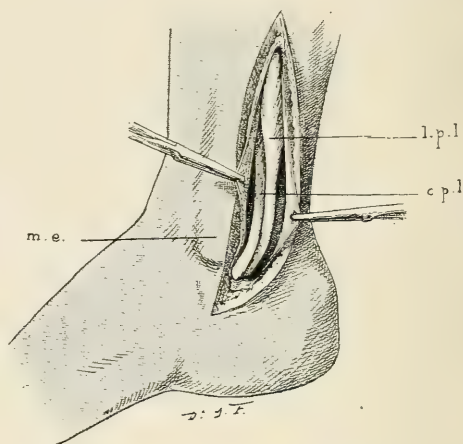


Fig. 762. — Exposing the peroneus longus.

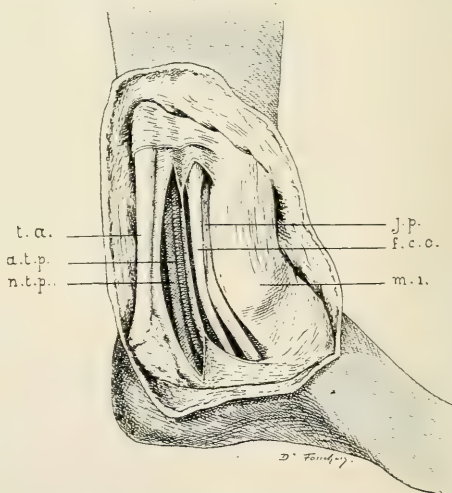


Fig. 763. — Relations of the tendons in the internal region of the ankle.

head of the humerus, which it is necessary to refresh over the whole of its circumference as well as the glenoid cavity (fig. 756, 757, 758). Fixation of the humerus to the scapula by two metallic wires perforating the acromion and the coracoid process, giving to the arm a

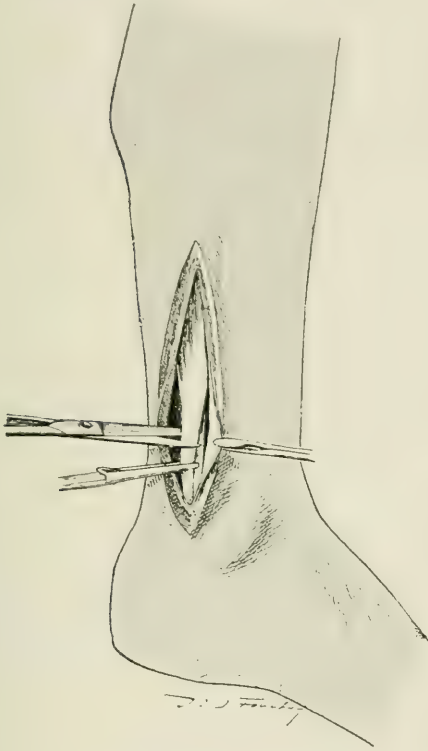


Fig. 764. — The peroneus longus is seized by the forceps and divided at 2 or 3 cm. above.

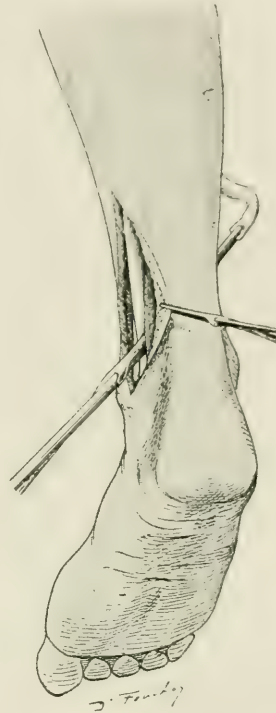


Fig. 765. — A long forceps is introduced into the internal wound obliquely, passing close to the bone, to seize the end of the peroneus longus.

considerable elevation from the side and forwards. Fixation for three or four months.

The time having passed, you verify the union of the humerus and scapula. The elevator muscles of the scapula now move at the same time the humerus. The arm carried before like a useless weight may regain its usefulness, the hand may be raised to the face (fig. 759).

Post operative gymnastic treatment is of great value and is absolutely necessary to complete the edifying success.

b. In the presence of a *partial paralysis* of the muscles of an articulation you will very often have two pathological conditions to contend with; contracture¹ and loss of function.

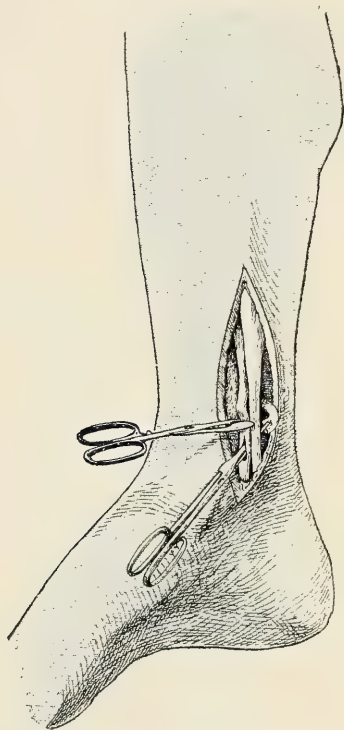


Fig. 766. — A forceps draws upwards the tibialis posticus, a second draws the peroneus through the button-hole.

You commence the treatment by the modelling redressment of the deformity. Then you make up for the loss of function by practising the **transplantation of tendon**. The idea, in this operation, is to profit by the healthy muscles in the neighbourhood, so as to transmit their function in place of that of the paralysed muscle.

Before proceeding with the operation, you make an exact plan, studying carefully the sound muscles and those paralysed.

It is necessary for you to take into consideration that one may not sacrifice a muscle altogether for a graft unless its function is of little importance (v. fig. 739), and that, on the other hand, it is necessary to divide the sound tendon in such a way that one part may be employed for the graft whilst the remainder preserves its primitive function (v. fig. 740). Partial transplantation or division of functions.

As to the technique, take notice of the following advice :

Minute asepsis of the field of operation, Esmarch's bandage. Longitudinal incision so extended as to lay bare the sound and paralysed tendons up to the peripheral extremity of their muscles, which allows you to ascertain the state of the latter.

Protect the tendinous sheaths as much as possible, cut or divide the tendons, distributors of power, lead the sound tendons towards

1. The Germans call contracture what we call deviation.

the paralysed ones, directly, if they are near, or, if they are not too far away, by tunnelling the soft parts with a blunt instrument.

To obtain intimate union of the two tendons, draw the sound tendon through one or two button-holes (fig. 766) made in the paralysed tendon. Suture the two tendons with a few stitches of silk

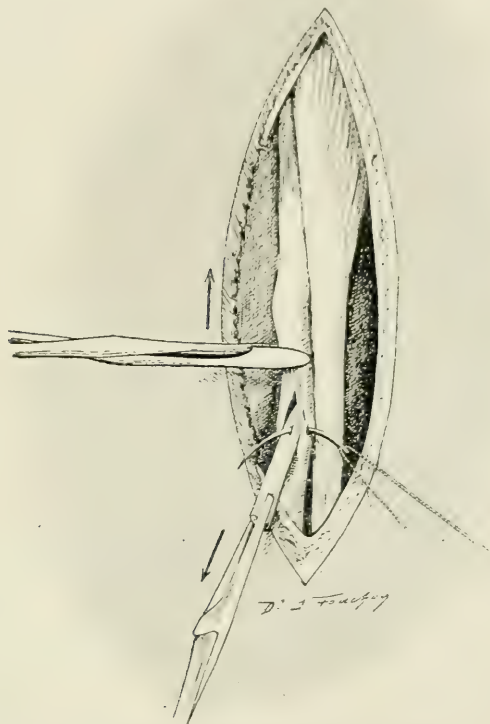


Fig. 767. — Suture of the two tendons.

boiled in sublimate solution. Take care that the suture is not made with a tension too strong for the two tendons, by drawing them in the opposite direction with the forceps in such a way that, when the operation is finished, the articulation is found to be fixed in a corrected position. Complete suture of the skin. Aseptic dressing, then plaster. Immobilisation in bed for five or six weeks. Post operative treatment prolonged by massage, electric current and gym-

nastics, to accustom the muscles, and especially the nervous system, to their new function.

Here are several other examples of the application of the method in cases of pes equinus, or talus, or varus, or valgus.

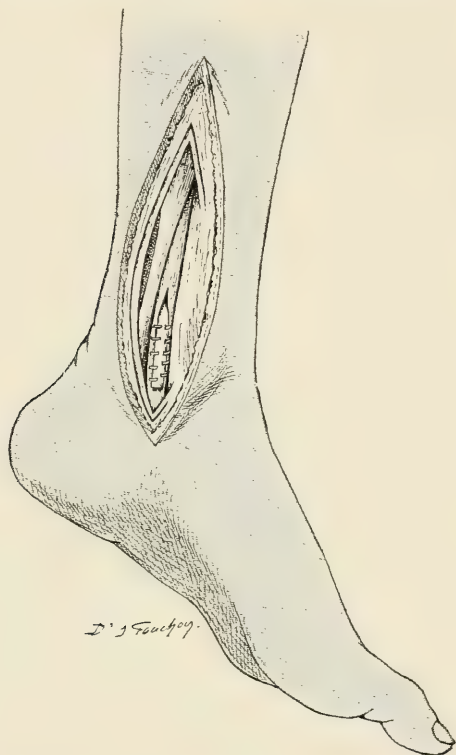


Fig. 768. — The end of the operation represented on the foot opposite.
Suture of the tibialis posticus.

But technical indications so summary would not enable you to understand; and, to be really useful, we ought to enter into all the details of one of these operations from the first to the last.

A typical transplantation.

Here is, for instance, the minute description of the transplantation of a tendon, supposing that we wish to graft the peroneus longus on to the tibialis posticus.

After having carefully sterilized the foot and the leg, and after having placed the Esmarch's bandage on the thigh, we will make our first incision.

This commences behind, at a centimetre above the internal malleolus, and directed from below upwards, for a length of from 7 to 10 cm., according to the height of the patient.



Fig. 769.

After having divided the skin and sub-cutaneous tissue, one reaches the deep fascia which we open in the same direction and for the same extent as the skin: in this way we expose the flexor tendons of the toes and of the tibialis posticus. We isolate this without injuring the sheath up to its muscular belly, which presents to the eye a pale rose or yellow colour.

Then, the second lateral incision (fig. 761, 762, 763), commencing behind and 2 or 3 centimetres above the external malleolus and reaching as far upwards as the median incision, but made 2 or 3 cm.

higher. We open the sheath of the peronei, and we isolate the tendon of the peroneus longus of which the muscular fibres satisfy one of its normal condition by presenting a deep red colour. The tendon is then fixed below by a forceps, in order to prevent the peripheral end from escaping after it has been divided now to 2-3 cm., above the forceps (fig. 764).

We introduce the point of the forceps into the inferior extremity of the incision and bore a tunnel which is directed very obliquely towards the upper end of the lateral incision.

The canal produced then finds its way



Fig. 770. — Talus foot.

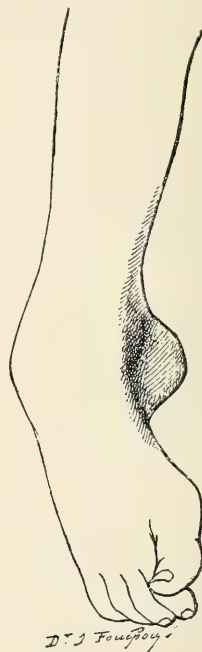


Fig. 771. — Club-foot, equino varus.

behind the fibula and between the flexors of the toes on the one side, and, on the other, the vessels, nerves and areolar tissue surrounding the tendo Achillis, to the peroneus longus.

One dilates the canal a little by opening slightly the forceps, which seizes the central end of the cut tendon and conducts it through the tunnel (fig. 765).

The foot placed in slight hyper-correction, we catch hold of the tibialis posticus with a second pair of forceps. With a fine bistoury

we make a button-hole in the tendon corresponding to the opening of the tunnel.

By means of a pair of fine forceps, we pass the tendon of the peroneus through the button-hole. We draw on the tendon sufficiently strongly in the centrifugal direction, and commence to suture with



Fig. 772. — Valgus flat foot.

silk soaked in solution of sublimate. The first suture fixes the tendon of the peroneus in the button-hole, those afterwards join together the parallel tendons.

A last suture holds the two tendons above the button-hole (fig. 767, 768).

Finally, two or three sutures shorten the tibialis posticus in the central part, if it be necessary.

We close the incision in the skin without troubling about the fascia.

It remains to fix the peripheral end of the peroneus longus to the peroneus brevis, without tension, by two or three sutures, and to close the lateral incision.

A very exact antiseptic dressing to prevent movement of the foot, and a plaster bandage from the toes up to the knee, which is kept on for five or six weeks.

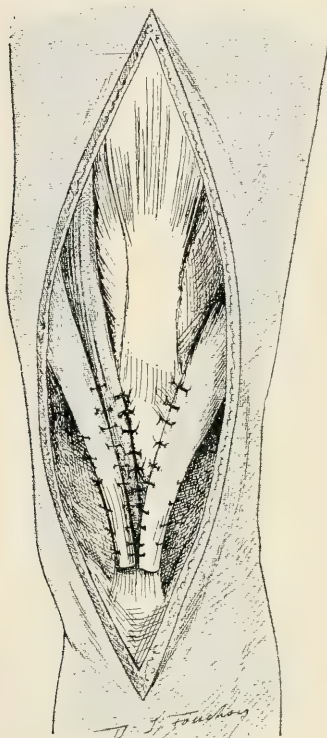


Fig. 773.

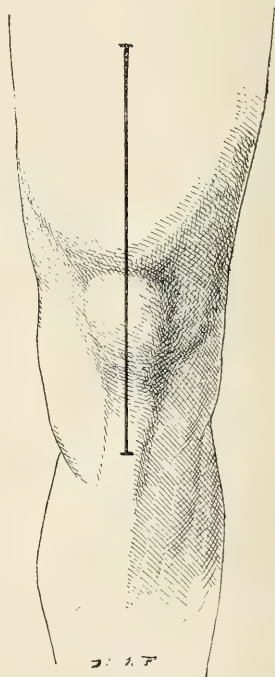


Fig. 774.

1st Foot-jin equinus (fig. 730). — *a*. You find the *tibialis anticus* completely *paralysed*, the other muscles intact. After having lengthened the tendo Achillis, if it is shortened, it is necessary for you to transplant the extensor of the great toe entirely on to the *tibialis*. The peripheral end of the cut tendon is fixed to the extensor of the toes, to prevent the great toe becoming flexed. The operation com-

pleted, the foot ought to have a position of at least a right angle. (fig. 769). *b.* Paralysis of the *tibialis anticus* and of the *extensor communis digitorum*. The same operation as in N° 1, and again transplantation of the peroneus longus on to the extensor communis digitorum; the peripheral end of the peroneus longus is fixed to the short peroneus.

c. Paralysis of the *three anterior muscles*. Operation: transplantation of the peroneus longus and of the flexors of the toes to the tibialis anticus and to the extensors of the toes through the *interosseus membrane*.

2nd. **Talipes calcaneus** (fig. 770). — *Paralysis of the triceps surae*. Operation: Redressment of the deformity and elongation of the anterior tendons, if it be necessary. Transplantation of the peroneus longus, of the flexors of the toes and of the great toe on to the tendo Achillis or directly on to the periosteum of the calcaneum. Fixation of the peripheral end of the peroneus longus on to the peroneus brevis. As a consequence of the operation, the foot ought to have a position of slight talipes equinus.

3rd **Talipes varus** (fig. 770). — *a.* Paralysis of the *extensor of the toes*. Operation: plastic elongation of the tendo Achillis, if it is necessary. Transplantation of the extensor of the great toe on to the extensor of the toes. If this muscle seems to be insufficient, take part of the peroneus longus to reinforce the extensor of the toes (fig. 771). Fixation of the peripheral end of the extensor of the great toe to the extensor of the toes. At the end of the operation the foot should be found at a right angle and slightly in valgus.

b. Paralysis of the *extensor of the toes* and of the *peronei*. Transplantation of the extensor of the great toe, and, if it appears necessary, of part of the tibialis anticus, on to the extensor of the toes. Transplantation of the tendo Achillis on to the peronei. Fixation of the peripheral end of the extensor of the great toe on to the tibialis anticus. Position of the foot produced immediately by the operation: at a right angle and slightly in valgus. The same procedure for the tendo Achillis as in the preceding number.

Talipes valgus (fig. 772). — *a.* Paralysis of the *tibialis anticus* and *tibialis posticus*. Operation: Transplantation of the extensor of the great toe and of part of the extensor of the toes on to the tibialis anticus. Transplantation of the peroneus longus on to the tibialis posticus, by moving it inwards, between the bone and the tendo Achillis. Fixation of the peripheral end of the peroneus longus to the peroneus brevis.

b. Paralysis of the *tibialis anticus* and *tibialis posticus* and of the

peroneus longus. The same operation as above (a) on the anterior group. Replacement of the *tibialis posticus* by the flexors of the digits or by part of the *tendo Achillis*.

c. Paralysis of the *tibialis anticus* and *tibialis posticus* and of the *tendo Achillis*. Operation : The same transplantation as above (a) in the anterior group. The flexor of the toes on to the *tibialis posticus*,



Fig. 775. — Extension of the leg rendered possible by transplantation to the quadriceps.

the flexor of the great toe and the *peroneus longus* on to the *tendo Achillis* or directly on to the periosteum of the internal border of the calcaneum. The peripheral end of the extensor of the great toe is fixed to the extensor of the toes, the peripheral end of the *peroneus longus* to the *peroneus brevis*, etc.

The Transplantations of Tendons at the Knee.

As to the knee, what is required of transplantation seems more difficult of accomplishment, because the muscle to be replaced, the quadriceps, is very large and of great functional importance. However, experience has shewn that it is possible to respond to the exigences of the situation.

It is necessary for you to know that paralysis of the quadriceps alone is not a sufficient indication for operation, but that it is indicated only in the case of functional troubles which are not in the least the regular sequence of the paralysis.

If the flexor muscles of the knee have escaped the paralysis, one may notice that, in walking, their exclusive action provokes a flexion of the joint, and, by that, the danger of falling, and later, one finds



Fig. 776. — The same case demonstrating the possibility of flexion.

even a contracture of the knee in flexion, which suffices to make walking unsafe.

That is why one sees such patients supporting themselves in walking by placing the hand on the thigh.

It is not rational, in such a case, to transplant the flexors wholly or in part on to the tendon of the quadriceps or directly on to the patella (fig. 773 and 774).

Apart from these muscles, it is the sartorius which, by its anatomical situation, is the especially appropriate substitute for the quadriceps, and which escapes paralysis astonishingly often.

You will excuse me from giving you the details of this operation which, although not serious or difficult, demands, however, very

extensive manipulations of the soft parts, and, accordingly, an absolute asepsis, and a large amount of practice.

Permit me only to tell you that, by this method, one can obtain very satisfactory and, at the same time, interesting results as to the physiology of movements (fig. 775 and 766).

Transplantations in the Upper Limb.

The same warnings hold good for the practitioner with regard to similar operations in the arm, and especially the fore-arm. The



Fig. 777. — Patient walking « on all fours ».

musculature is more complicated than in the leg, and requires a more extensive practical experience.

After having explained the different methods of surgical treatment of the paralysed child, it remains for me to tell you that one ought very often to combine these methods in order to obtain the best possible results.

It is precisely this appropriate combination which allows of such remarkable successes in serious and extensive paralyses which render

walking possible to individuals who were before obliged to walk "on all fours" (fig. 777 and 778).

We will conclude by supplying the **results** in a more detailed



Fig. 778. — The same patient after treatment.

way. And you will permit me to rely upon my own experience, the fruit of thirteen years' special work.

What ought we to hope, what can we promise to a patient, who is confided to our care by the family, as to the sequelæ of a special paralysis?

You are convinced that the degree of amelioration or the perfec-

tion of the cure varies according to the extent of the paralysis and according to its localisation.

On the whole, you will perhaps see less complete results in the arm than in the leg.

However, you, as well as your clientèle, will rejoice at each amelioration obtained in the upper extremity, because such cases were considered incurable up to our day. We will first examine the results obtained *in the arm*.

It is not too much to say that the effect of arthrodesis of the flail-like shoulder is a real miracle :

For the function returns, increasing year by year, to a limb until then absolutely useless.

I have been able to convince myself that by transplanting a portion of the triceps to a paralysed biceps of the arm, one is able to obtain the return of its function independently of the triceps; and it is the best proof of this fact that you are able to divide a muscle into two individual muscles endowed with their own proper and even antagonist function.

As to the fore-arm, you have the right to say that paralysis of the radial nerve does not any longer remain incurable. In shortening the extensors of the wrist, you give to the hand those positions of hyper-extension necessary to close the fist firmly. You add transplantation of a flexor of the wrist to the extensor of the fingers, and you will have recovered enough strength and dexterity for any number of manual occupations.

These results as to function, however agreeable, do not attain complete restoration, and consequently remain inferior to the results obtained *in the leg*.

You can cure all the paralytic deformities of the foot, not only in a temporary manner, by means of redressment, but radically, by adding arthrodesis or a plastic operation on the tendons.

Arthrodesis of the foot, completed by a fascio-tenodesis, changes the flail-foot into a precious support and restores entirely to the limb its locomotor function.

And your success will be no less brilliant in arthrodising the knee when it is totally paralysed.

Without doubt, the results of a tendinous transplantation will cause you much satisfaction, it is an operation which preserves not only against a relapse, by enfeebling the antagonist muscles, but gives you a quasi-perfect cure.

You will attain the ideal object in the case where there is only one muscle paralysed and surrounded by sound muscles — a success

which has a progressive character by the exercise of the muscles and of the nerve centre, presuming that your plan of operation and your technique have been good.

Allow me to relate some examples :

In the case of a *talipes equinus* you find yourself confronted with the sole duty of transplanting the extensor of the great toe on to the *tibialis anticus* which is exclusively paralysed : perfect success is assured you.

In the second case, it is necessary for you to add grafting of the *peroneus longus* to the extensor of the toes : you will see the movement of the extensor muscles reappear.

In the third case, you cause to arise out of the complete helplessness of the three anterior muscles a limited dorsal flexion, but sufficient, by introducing the *peroneus* and the flexor of the toes.

You will see reappear, in the case of *talipes calcaneus*, firm plantar flexion surmounting the weight of the foot, you will see your patient walk plantigrade. Letters of gratitude will come to you, perhaps from the top of a mountain, or from a ball, such as I have received.

The frequent relapse of *talipes varus* will never again be brought before your eyes with the discouraging “ non possumus ” : you make rather the redressed foot to raise itself into a mean normal position, you will procure for it even an active abduction.

You will find, it is true, more difficulty in the treatment of paralytic *talipes valgus*, because the weight of the body always has a tendency to destroy the effects of your operation. But by calculating well the muscular forces to be transplanted, you should be able however to obtain a good result, that is, the normal position of the foot, and even active supination.

You will re-establish the function of the paralysed quadriceps femoris by transplantation, and you will see your patient walk without the help of a support, and without fear of the roughness of the road.

I have been able to show such patients climbing easily the stairs and even ladders.

In summing up, I can only say to you, from experience and conviction : “ Practice plastic operations on the tendons, and you will have a harvest of satisfaction for yourself and of happiness for your patients ” (Vulpius).

THIRD PART

CONGENITAL ORTHOPÆDIC AFFECTIONS

CHAPTER XIV

CONGENITAL LUXATION OF THE HIP JOINT

A. — Diagnosis.

First of all, a word on diagnosis and prognosis.

1st PRESUMPTIVE SIGNS. — They bring to you a child — generally a little girl — who is lame on one or both sides, **waddling** and **balancing** herself on her hips, **like a duck**.

She walks willingly, however, like a child who is **in no pain**. There already are two signs : the characteristic walk and the absence of pain, which ought to make you think of a congenital luxation of the hip, even before the parents have said anything.

If the swinging, if the rolling movement exists on both sides, the thing is almost certain. If the swinging is on one side only, it is a **simple presumption**.

2nd SIGNS SHEWING PROBABILITY. — But the parents say to you : Our child **has always walked in this way**, from the very **first attempts**, which, however, were **late**, for she did not commence to walk until sixteen, eighteen, or twenty months. She has never suffered. This **waddling** were been nothing, but it now seems that it is still **increasing** for some time, and that the **leg** is becoming **shorter**.

With this history, the existence of a congenital luxation of the hip becomes **probable**, even more than probable. However, you will not be able to affirm that it is so until after having examined the child *completely naked*, first in the upright position and whilst walking, then laid on a table or on the floor.

Character of the walk. — When the child walks, you will see the **great trochanter more prominently** on the lame side (v. fig. 779 to 784), **rising** into the buttock and **descending** with each step. It

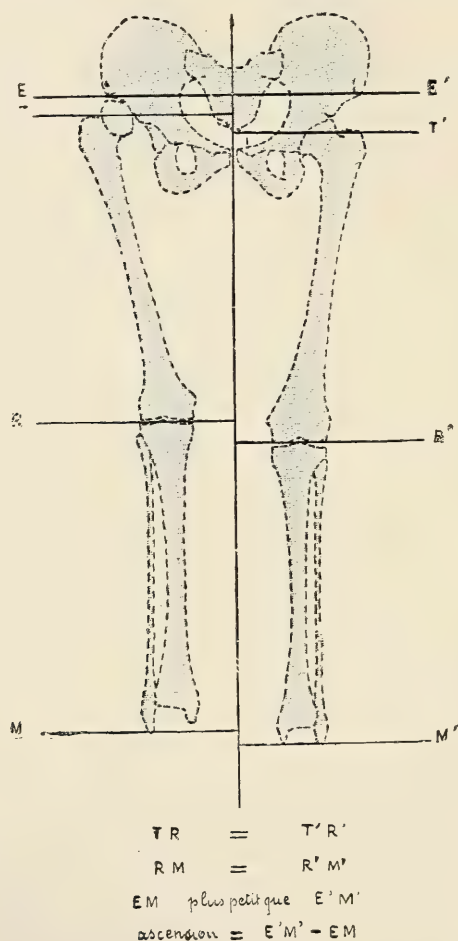


Fig. 779. — Congenital luxation of the right hip.

rises up with each tread, as if the sole of the foot had been placed on a spring.

Examination in the recumbent position. — On placing the two iliac

spines at the same level, and in bringing together, afterwards, the two feet, you see that *one limb is shorter than the other*, if the child is lame



Fig. 780. — Right congenital luxation of ten years' standing. — One sees the wasting of the luxated limb. The shortening is enormous. The sound leg is obliged to bend on itself at the knee when both the heels are on the ground.

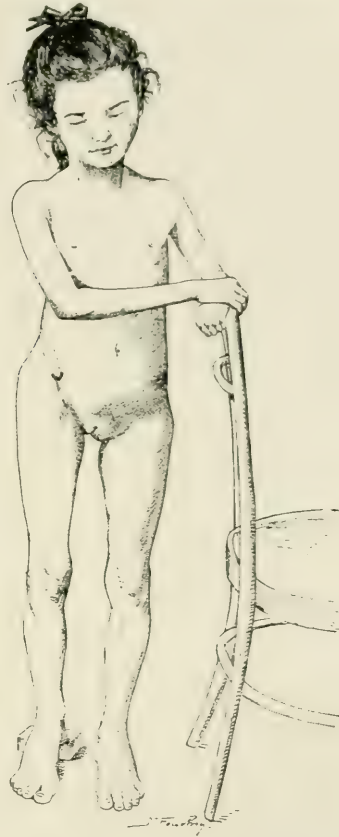


Fig. 781. — The same. The sound limb is no longer bent at the knee, the heel of the luxated side no longer touches the ground (the iliac spine remaining at the same level). The trochanter, more prominent and more raised on the side of the luxation. — The labium majorum is also drawn up on this side.

on only one side. The great trochanter is projecting on this side; it is **raised** above **Nelaton's line** (fig. 782), which you determine by car-

rying a tape from the iliac spine to the ischium¹, whilst the thigh is flexed at an angle of 45° ; more than that, the trochanter is moved away from the median line: the labium majorum is drawn upwards.

On looking at the profile, you will find a lumbar concavity. But that does not give you the *certain sign*.



Fig. 782. — The same, seen from the side. — Lumbar hollowing. — One sees how the great trochanter is raised above Nelaton's line. — If there were no luxation, the trochanter would be level with Nelaton's line. — Shortening of the limb (heel off the ground, the two iliac spines being at the same level.



Fig. 783. — The same, seen from behind. — Lateral deviation of the back with convexity on the sound side. — It is so in most of the cases (but not always).

3rd THE CERTAIN SIGN. — You will obtain it by palpation of the hip made when the child is lying down, the thighs well extended.

Palpation of the Hip (fig. 786 to 791). — This will give you two indications which, taken together, are pathognomonic.

1st If, clasping the upper part of the thigh with the hand half opened, the four last fingers behind the trochanter, the thumb in

1. For Nelaton's line see fig. 392 and 785.

front, you endeavour to palpate **the head of the femur** in its **normal situation**, that is, in the fold of the groin, beneath the femoral **artery**,



Fig. 784. — Examination of the child in the recumbent position. — Very distinct shortening of the limb. The trochanter is raised above Nelaton's line (to an extent practically equal to the shortening).

which **crosses** the **head** at the junction of the inner third and

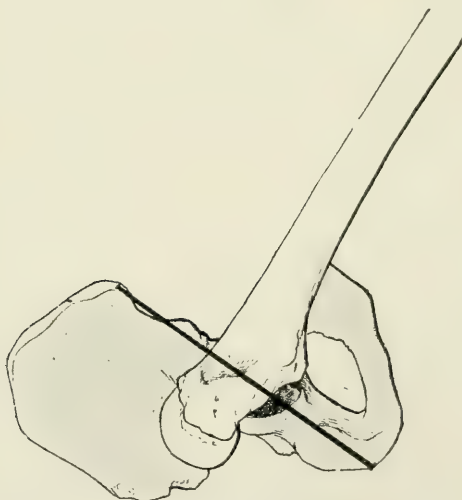


Fig. 785. — Luxated hip. — Relations of Nelaton's line and of the trochanter in the skeleton (the thigh flexed at an angle of 45 degrees).

external two thirds — you will feel **no osseous resistance**; you will find an **empty space** below the anterior border of the iliac bone.

To render this impression more precise, compare it with the other, normal, hip. You will perceive there, on the contrary, very distinctly, the bony resistance of the head (which is out of the acetabulum for a centimetre or a centimetre and a half) and even of the anterior surface of the neck (v. fig. 332 and 333, p. 354).

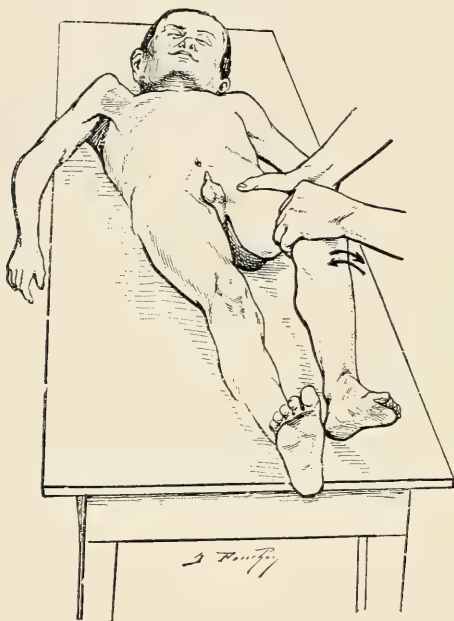


Fig. 786. — Diagnosis. Method of palpating the head of the left femur. The position of the right hand ; the four fingers behind; the right thumb in front in touch with the artery. The left hand grasps the limb at the knee, imparting to it the different movements of internal and external rotation, flexion and hyper-extension, abduction and adduction. The right thumb is against the outer side of the femoral artery which is felt with the extremity of the pulp.

2nd If you grasp the knee of the suspected side and impart to it extensive movements in all directions, you will generally see, and you always **feel, above and within the empty space** mentioned above, a **rounded, mobile body**, very mobile, raising the skin in front (fig. 790) during the movements of **hyper-extension**, of **external rotation** and of **abduction** of the knee, raising it, on the contrary, behind (fig. 791), towards the buttock, in the opposite movements of

flexion, of internal rotation and adduction: palpate this hard, rounded body — it can only be the head of the femur.

Here is the certain sign of luxation. Moreover, the **history** enables you to say that it is congenital.

Diagnosis of double luxation (fig. 792). — Double luxation is recognised by the waddling gait existing on both sides, by the projection of both trochanters and their position above Nelaton's line.

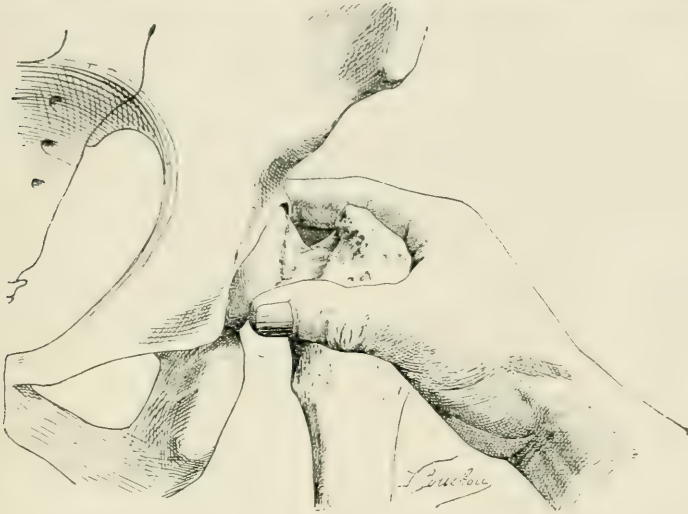


Fig. 787. — Method of palpating a normal hip joint. — Exploration of the head. The trochanter is embraced by the first interdigital space, the thumb in front; the others fingers behind are able to feel only very feebly the movements imparted to the head.

by the shortness of the two thighs in comparison with the length of the legs, and finally, by the perception on both sides of vacant spaces, where the heads of the femurs ought to be found, and the recognition of those heads above and without their normal situations.

B. — Prognosis.

The lameness from birth which, hardly twelve years ago, was considered to be incurable, **can generally be cured** today: it is no longer possible to doubt it (without the exhibition of inexcusable ignorance), after the number of proofs clinical, radiographic and anatomical, which we possess. Some hundred of children have

already been cured, that is, they are no longer lame at all, and several autopsies of children treated, dying of intercurrent diseases, have shewn that the head of the femur had been replaced in the normal position and kept there.

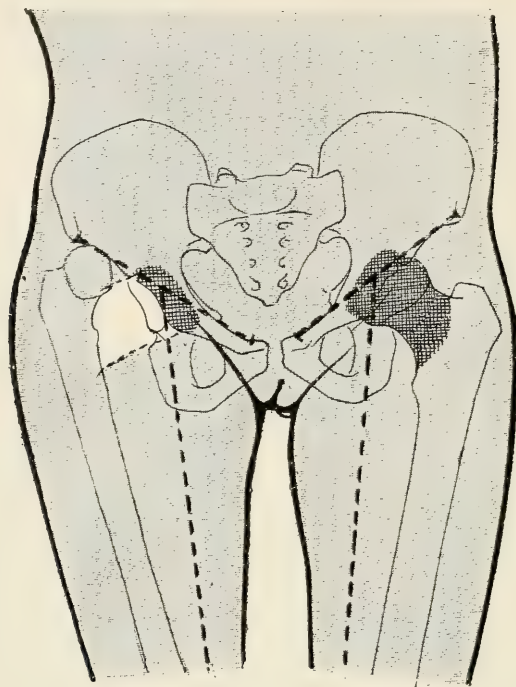


Fig. 788. — Normal hip on the left, luxated hip on the right. On the left, one finds a bony resistance very high up. On the right, a sensation of an empty space : below the iliac bone and on the anterior wall of the acetabulum, represented by hatching, one sees the empty space represented in white (there, where the head and neck of the femur ought to be).

This “ preliminary question ” of the **curability** of congenital luxation is, then, no longer disputable.

More than that, one cures by a treatment which, far from being complex and uncertain — which it lately was — has become, during the last few years, so simple, so harmless, so well understood, that it may be performed henceforth, by all practitioners of ordinary intelligence, with the proviso, always, that one deals with children in their earliest years, from two to five.

I agree that, after that age, the treatment remains, for practitioners

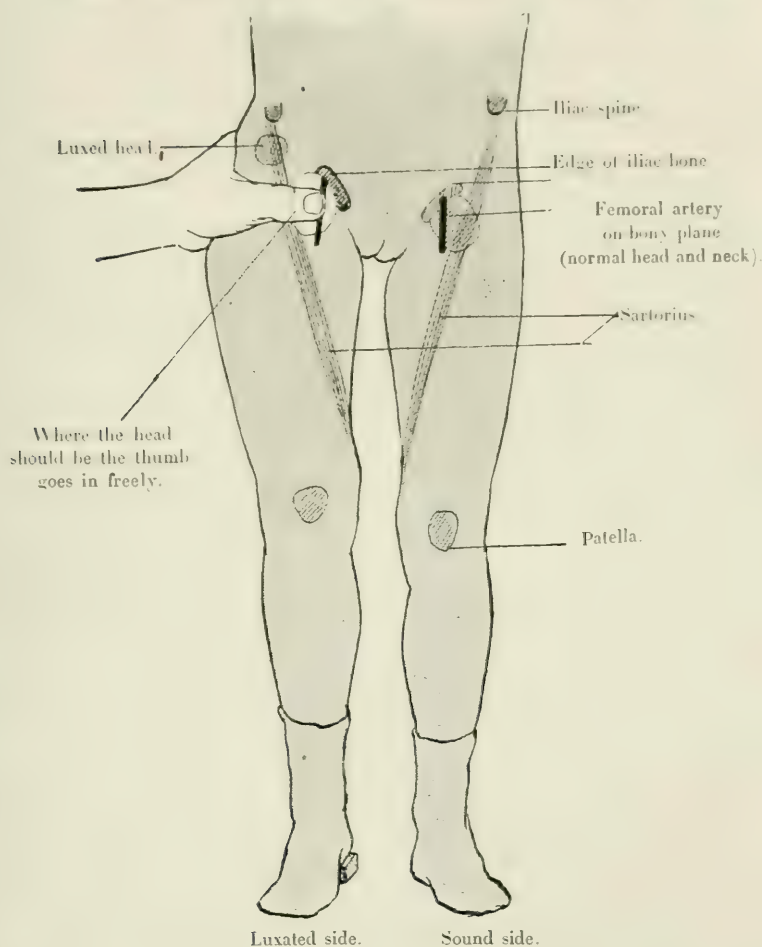


Fig. 789. — Congenital dislocation of the right hip. Diagnosis. One sees : 1st the shortening of the leg on this side : raising up of the heel, the knee and the labium majorum; 2nd the great trochanter (partly hidden by the hand) is more prominent on this side; 3rd the certain sign obtained by palpation : whereas on the left. (normal) side, one feels the bony resistance of the head of the femur under the artery below the margin of the iliac bone, on the right (luxated) side, the finger penetrates freely under the artery, the head being no longer in its place : 4th one finds the head above and behind its normal position, near the spine, underneath the sartorius. One sees that the luxated head is rather smaller than the other.

ers who are not specialists, too arduous and too unreliable, and I hardly advise them to interfere at above from 6 to 8 years : but, at 2,

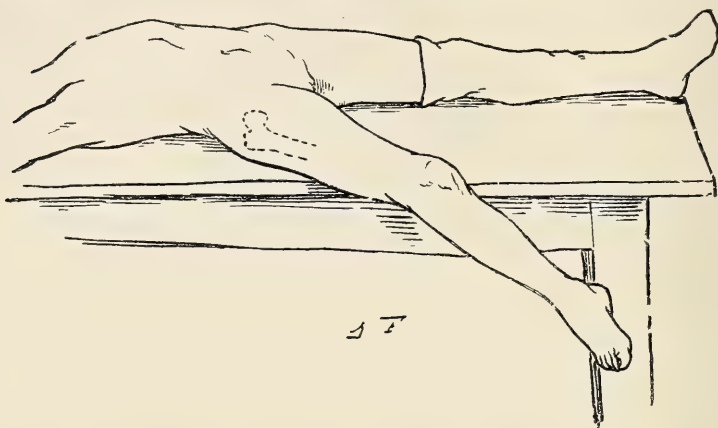


Fig. 790. — Exploration of the head. — To make the head project forwards, one places the limb in hyper-extension and external rotation.

3 and 4 years, all practitioners, I repeat it, will succeed, by following the indications given in this chapter, in reducing, and keeping in position, this luxation.

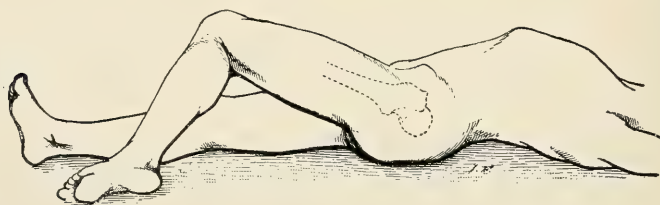


Fig. 791. — Exploration of the head. — By the opposite movement of the limb (flexion, internal rotation and adduction) one carries the head backwards into the buttock.

But, notice that, in practice, it is to them, it is to the family doctor, that these children are shewn in their first attempts at walking, or, at least within 2, 3 or 4 years.

Your diagnosis established, the parents ask you what is to be done ; you will reply that it is necessary to reduce the dislocation as if one

were dealing with a traumatic luxation of the shoulder: that you arrive in this way at complete cures and, one may say, permanent cures: but that, as in the traumatic luxation, it is necessary to lose no time, because if **reduction** is possible and even **easy at the beginning**, that is, at 2, 3 or 4 years, it becomes very awkward in later years, and even impossible to undertake at say from 12 to 15 years.

More than that, at 2 years of age, there exist little or no secondary lesions of the skeleton, and for that reason the cure that one can obtain in very young children is more perfect and more permanent.

On the contrary, *left to itself*, the luxation is aggravated year by year up to the prohibitive age — always or nearly always. The lameness will become more and more unsightly and the attempts at walking more and more feeble. It is not uncommon to observe, at a certain period, painful crises and even an almost complete inability to walk.

Therefore, **delay in treatment** on the part of the practitioner in the presence of this malady is no longer excusable.

The best age for commencing treatment

What we have said shews that it is of supreme **interest** to reduce congenital dislocations at the age of a year and a half, or **at least** at two or **three years** (see p. 805, the limits of reducibility).

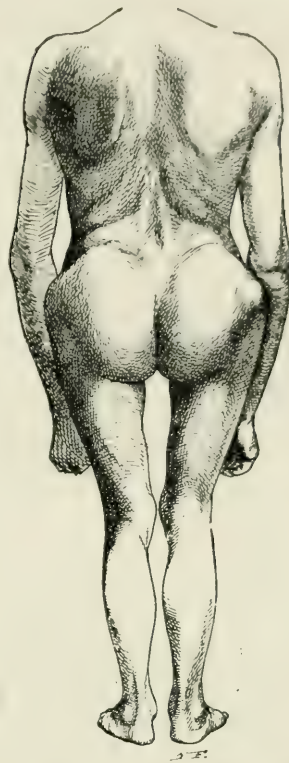


Fig. 792. — Double luxation seen from behind. — One can remark the enormous projection of the trochanters, the apparent shortness of the thighs, and their broadening at the upper part, as soon as the knees are in contact.

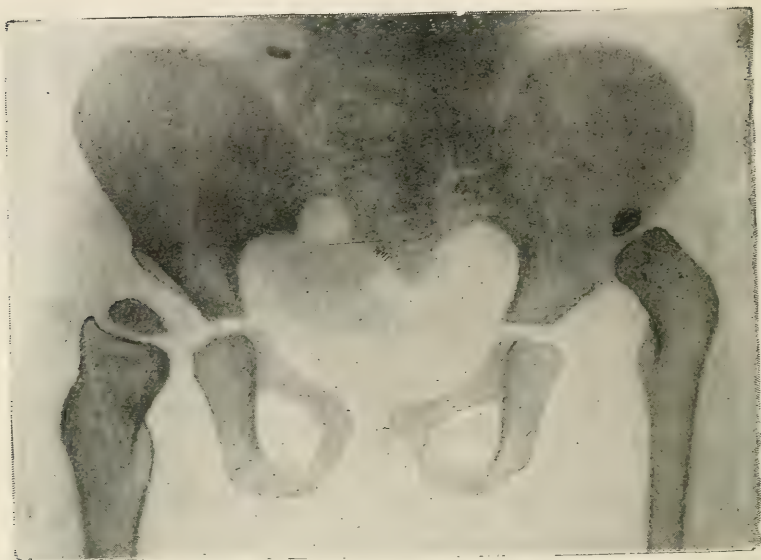


Fig. 793-794. — Shewing a young case (3 years) perfectly cured because there has been as yet no osseous deformities.



Fig. 795-796. — Case aged 11 years : a less perfect result here, because the osseous deformities persist, in particular a coxa vara, very marked on the left side

TREATMENT ¹

The treatment consists, **schematically**, in replacing the head of the femur in the disinhabited acetabulum, the reduction being easy here, in children of 2, 3 or 4 years — and by maintaining it artificially by a plaster for 5 or 6 months. This period suffices for the acetabulum to be hollowed, for the joint capsule to contract, that is to say, for the head to make in its normal position a stable and definite domicile.

After these 5 or 6 months, one sets the limb at liberty. The reduction will henceforth maintain itself, and walking will become, a few months after removal of the plaster, that of the normal child.

I. — THE TREATMENT IN EASY CASES

that is, in children of two or three years of age.

A. — UNILATERAL LUXATION

It is necessary for us to study the method of reducing the displacement and the method of maintaining the reduction.

1st. The Reduction.

At two or three years, you can proceed **immediately** to this reduction, that is, from the very day the child is brought to you, or on the next day.

You will be able to reduce without anæsthesia, if the parent absolutely object to it. But, in all cases where you have entire liberty of action, you will anæsthetise the child, which will save it from all pain and will very much facilitate your proceedings.

Manœuvres preparatory to Reduction.

The child being anæsthetised, **before attempting to reduce**, it is necessary to perform brassage, kneading, and stretching of the adductors by a number of wide movements of circumduction of the thigh, in such a way as to render supple and to stretch

¹. Pravaz, Paci, Lorenz, are three names one must always allude to when speaking of this treatment.

the soft tissues, articular and periarticular, which are contracted (v. fig. 797).

I have no need to describe at length these movements of circumduction, which will be made in all directions (for a few

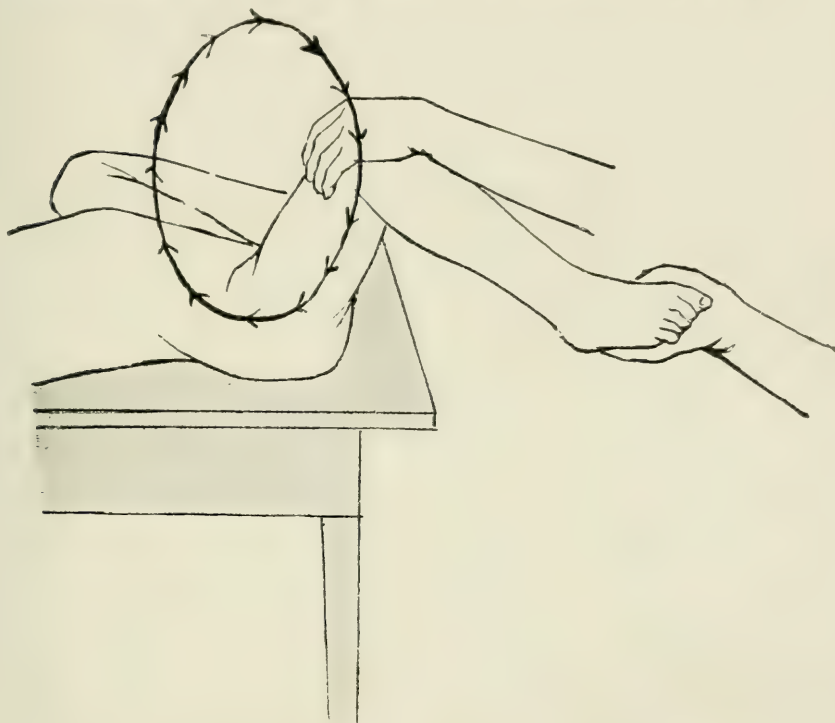


Fig. 797. — *Manœuvres preparatory to reduction* (1st step. Movements of circumduction to stretch the contracted peri-articular tissues;

seconds), but I ought to tell you the method of performing kneading of the adductors.

Kneading of the adductors. — The pelvis being immobilised on the table by an assistant acting by the intermediation of the sound limb flexed on the abdomen or on the outer side (fig. 798 and 799), you request a second assistant to make firm

traction upon the affected **thigh extended** and to carry it more and more **into abduction** (fig. 798), or to **flex the thigh at an angle of 90°**, and to carry it afterwards in abduction (fig. 799), as far as possible, proceeding slowly and methodically; but the assistant is very soon stopped, precisely by the resistance of the adductors, which are there, stretched under your eyes.



Fig. 798. — Kneading and stretching of the adductors **in extension** of the thigh. — The pelvis firmly fixed and supported by an assistant pressing the flexed, sound limb upon the abdomen; a second assistant pulls upon the affected limb and carries it into abduction. The surgeon exercises, with his clenched fist, some frictional movements along and upon the stretched cord, at the upper insertion of the adductors.

Place your two thumbs or your fist on a level with the pubic attachments of these muscles, *upon the prominent cord*, and press upon it more and more firmly, whilst the assistant carries the thigh still outwards. After one or two minutes of brassage, of pressure and of straining, you see and you feel that the muscles are giving way and permit of a much greater abduction of the thigh. Push this up to an **abduction at a right angle**, that is, up to the point where the knee touches the table. You

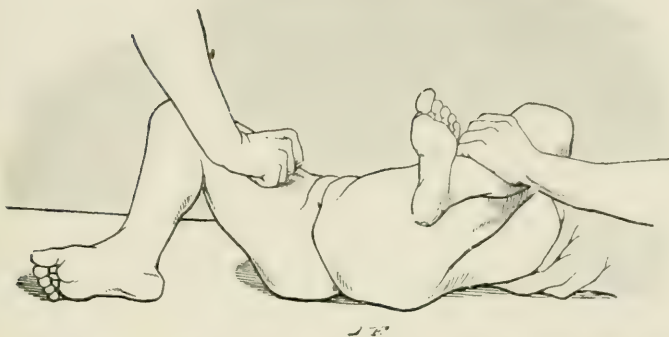


Fig. 799. — Kneading of the adductors (on the right side), the affected thigh being in **flexion** and no longer in extension. — The thigh is carried into abduction after having previously been placed in flexion at an angle of 90 degrees; the surgeon acts upon the adductors in the same fashion as in the preceding figure.



Fig. 800. — Reduction. — 1^{re} manœuvre. — Pelvis firmly fixed by an assistant. One grasps the knee, one carries the thigh into flexion at an angle of 90 degrees and makes traction very firmly upwards. With the left hand, one furthers reduction by pressing on the head of the femur.

will be able to reach this point without rupturing the muscles, by simply stretching them.

At the beginning of the intervention, you will confine your-

self to this simple kneading; you will not decide upon the rupture until later, in the case where you would have perceived in the course of the operation that you are not able to effect reduction without complete rupture; but this will never, or very rarely, happen, in small children, of whom we are speaking those of 2, 3, 4 years of age.

You will then obtain the rupture by pressing more and more firmly, being helped, if need be, by two thumbs placed over your own.

After the kneading and stretching



Fig. 801. — Route followed by the head round the acetabulum in the different positions of the thigh; *a* position at the beginning.

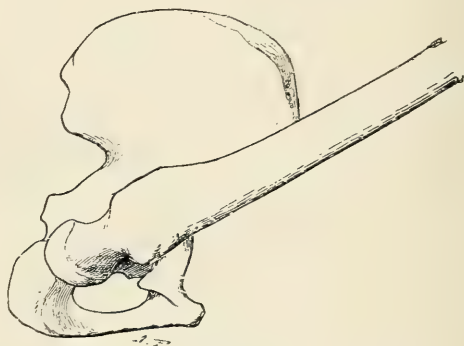


Fig. 802. — *b*. In flexion of the thigh of more than 90 degrees.

of the adductors, the reduction will have become easy. The adductor muscles are so much the direct obstacles to reduction that I have several times seen children, even of 8, 10 and 12 years, in whom lengthening only of the adductors in the position of **flexion and abduction** at an angle of 90° (fig. 806) has brought about the reduction, that is to say, that reduction effected **itself** whilst one was carrying out the manœuvre of stretching the adductors.

That ought to make us remember that abduction of the thigh is very favourable reduction.



Fig. 803. — *c*. In flexion at 90°.

Manœuvres of Reduction.

To reduce the congenital displacement, you will employ, in a general way, the **manœuvres which you would instinctively**

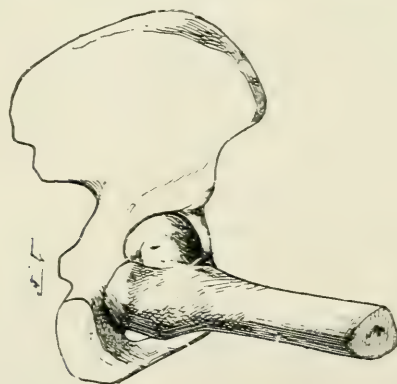


Fig. 804. — *d*. In making traction in flexion at 90 degrees and adding to it a marked abduction and very slight external rotation, one makes the head **re-enter** the acetabulum.

make, in order to reduce a **traumatic** luxation of the hip in the same child.

1st manœuvre. — **Flexion** of the knee at an angle of **90°** and **direct traction** on the flexed knee (**without abduction, adduction** or rotation).

a. One makes traction with one hand; with the other one presses upon the head outwards and inwards to assist reduction (fig. 800).



Fig. 805. — *1st manœuvre* (see fig. 800) made by 2 persons: one assistant pulls on the affected thigh, grasping it with his two hands a little above the knee. The surgeon applies his two thumbs directly over the head of the femur in order to push it into the acetabulum.

b. The manœuvre is made by two persons; one pulling on the knee, the other pressing directly upon the head of the femur (fig. 805). Persist for 1, 2, 3 minutes, until, under your fingers, you feel the head disappear all at once into the parts beneath with a more or less distinct click; it is reduced.

This first manœuvre nearly always succeeds in quite small children. If not (after 3 or 4 minutes of fruitless efforts) one passes on to the following manœuvre.

2nd manœuvre. — **Reduction in abduction** of the thigh at an angle of 90 (without rotation or with insignificant rotation).

One commences by flexing the thigh to an angle of 90° ; then one carries it into abduction with one hand, whilst the other hand presses from below upwards upon the head. One increases the abduction more and more up to a right angle, or rather until the reduction is effected.

One can perform this manœuvre alone, or better still with



Fig. 806. — *Second manœuvre.* — One flexes the thigh to an angle of 90° degrees, then one carries it into forced abduction. — In this movement, the femur see-saws under the thumbs of the surgeon, who presses the head from below upwards (reduction is effected in a variable degree of abduction, according to the case).

assistant, one effecting the abduction of the knee, the other making direct pressure upon the head of the femur from below upward (fig. 806).

If this manœuvre, repeated five or six times during three, four or five minutes, does not succeed, carry out the following, with which you will always succeed.

3rd manœuvre. — Reduction with **the thigh in adduction** and internal rotation of 90° . This manœuvre is almost the reverse of the preceding one (fig. 807 to 813).

The child being laid on the sound side, and the pelvis sup-

ported thus "edgewise" by two firm hands, one assistant takes the affected thigh, flexes it at a right angle, then carries it, no longer outwards, but inwards, in forced adduction, adding to it an internal rotation of 90° (note carefully that I say **internal** rotation), and pulls on the knee as much as he is able. You yourself then, placing your two thumbs on the head of the femur, easily perceptible above (v. fig. 807), push it with all your strength towards the acetabulum.



Fig. 807. — 3rd manœuvre, characterised by adduction and internal rotation added to flexion. The child laid on its sound side, the assistant grasps the thigh at its lower third, carries it in flexion to 90 degrees, then in forced adduction and internal rotation of 90 degrees. The surgeon presses with his thumbs upon the head of the femur, which has become much more accessible in this position of forced adduction. — One may have four persons for performing this manœuvre, two for pushing the head of the femur and two for traction on the knee.

It will make its way there, generally without any sound, with this manœuvre. When you have felt it sink under your thumbs and disappear into the deeper parts, you request your assistant, who is holding the thigh in adduction, to bring it (fig. 808) into abduction little by little, pulling it always towards him, until it has reached an abduction of 90° (fig. 809) that is, in a word, to the position indicated in the second manœuvre (fig. 806).

This translation of the thigh from within outwards, made

whilst you maintain the head firmly flattened against the acetabulum with your thumbs, achieves and completes the reduction.

SIGNS THAT REDUCTION HAS BEEN OBTAINED (fig. 814 and 815).

The reduction is **felt, is seen, is heard**, just as it is when you reduce a traumatic luxation of the shoulder.



Fig. 808. — 3rd manoeuvre continued. — The assistant at the knee, making continuous and strong traction towards him, raises himself gradually in order to reach the position of abduction. The surgeon continues to press upon the head of the femur. The second assistant shewn here immobilises the pelvis.

You feel the head disappear deeply, and the assistant also feels a shock; the assistants themselves see the bound of the head and hear the crack.

One cannot be deceived.

Should you wish, however, to render the reduction still more evident, *undo it*.

To do so, replace the knee inwards by pushing upon it: the

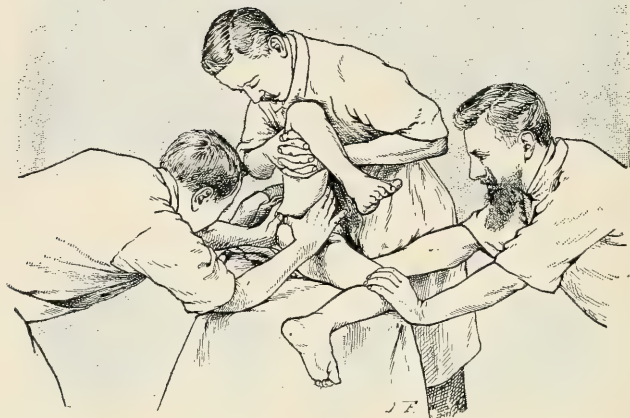


Fig. 809. — 3rd manœuvre (concluded). — One brings the thigh gradually to an abduction of 90 degrees.

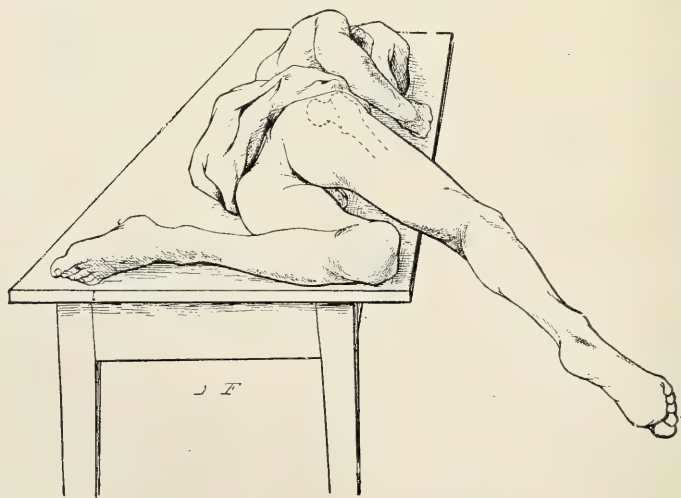


Fig. 810. — Explanation of the 3rd manœuvre.

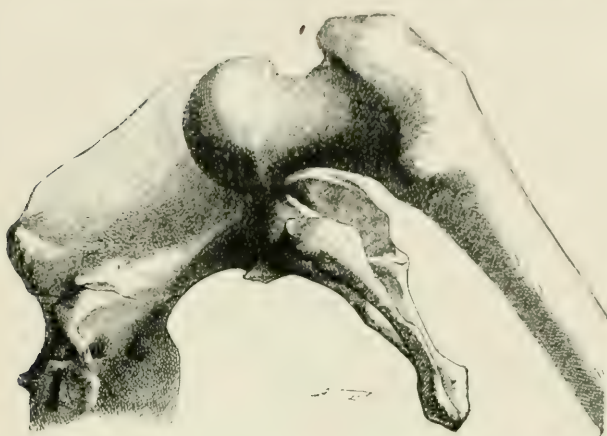


Fig. 811. — Explanation of the 3rd manœuvre (*continued*). The head strikes against the posterior border.

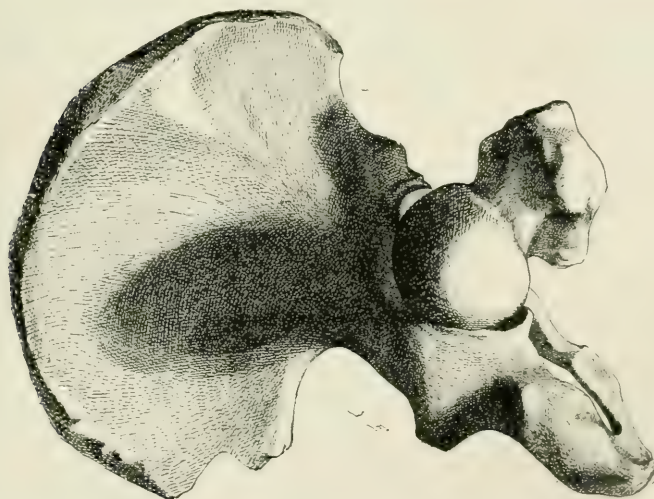


Fig. 812. — Explanation of the 3rd manœuvre (*continued*). — Position in fig. 811, posterior view.

reduction **disappears** with a crack and a jerk, sometimes very violent but always very distinct.

You repeat the reduction as on the first occasion, but it will be

obtained more easily; you begin again three or four times, which has the advantage of perfecting the reduction (v. also fig. 818).

After which you will occupy yourself in giving to the thigh the position desired for it's maintenance in the plaster apparatus.

2nd. The Maintenance of the Reduction. — Position to give it.

The reduction, thus repeated several times, preserves itself for

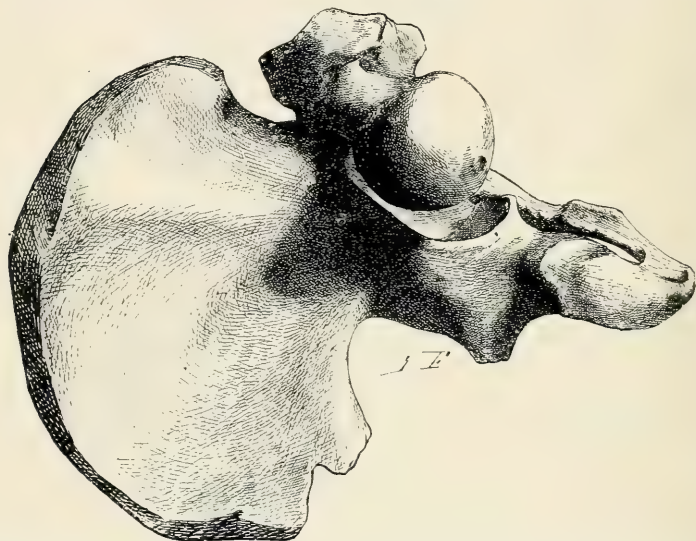


Fig. 813. — Explanation of the third manœuvre (*continued*). It is necessary, in order that the head may re-enter the acetabulum, to put the femur in very strong internal rotation.

a moment, but it will not maintain itself indefinitely and one is obliged to fix it with an apparatus (reaching from the umbilicus to the toes) for a period of several months, from five to six. This fixation will be made with two apparatus, two and a half months for each, applied in two different positions of the limb.

First position, first plaster.

One does not always maintain in the position where one has reduced the luxation; the position after reduction may vary



Fig 814. — Diagnosis of reduction. — The manoeuvres of reduction terminated, the surgeon brings back slowly the thigh inwards, at the same time he presses firmly on the knee. In a moment the head of the femur leaves the cavity abruptly, producing a more or less loud clicking sound. And one feels it again making a prominence behind the acetabulum, as before the reduction.

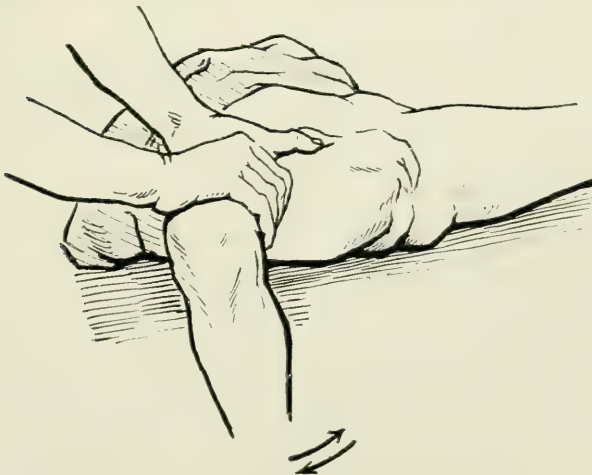


Fig 815. — Diagnosis of reduction by palpation. The left thumb is over the artery. It ought to feel the head of the femur rolling under it when the right hand imparts movements of internal rotation to the thigh.

CATOR. — Indispensable orthopedics.



Fig. 816. — Right congenital luxation : a girl of 10 years.



Fig. 817. — Radiogram taken immediately after reduction (see fig. 839).

according to the case, whilst the position of maintenance remains always the same (v. fig. 818 to 823).

Here is the position which you will give to the thigh in the first plaster, immediately after the reduction. — I formulate it thus: 70°, 70° and 0°; which means: 70° of flexion, 70° of abduction and 0° of rotation: it is the position at which one arrives in



Fig. 818. — By some movements of rotation outwards and inwards one enlarges the osteo-fibrous lodging place of the head, one perfects the reduction. One is helped in this also, by making some movements of forced extension of the leg upon the thigh, which elongates the muscles about to be inserted in the popliteal space.

placing the thigh, first in a **flexion** of about 70° (70° to 80°: fig. 824), then in carrying it, from that degree of flexion, directly outwards up to about 70° of **abduction** (70° to 80°), **without** imparting any **rotation** to it whatever¹ (fig. 825).

70°, 70° and 0°, that is the **position by choice** of the thigh.

1. The thigh appears then to be in external rotation, but it is only so in appearance. Try on yourself to flex the thigh to 90° and from that point to carry it directly to 90° of abduction. Your thigh will appear to be in external rotation, and nevertheless you have not made rotation at all: the thigh is stopped in "indifferent" rotation, at 0°.

the best position for the excavation of the acetabulum. — As to

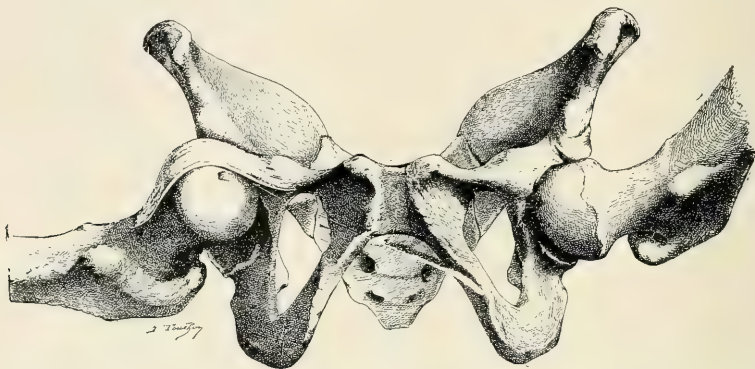


Fig. 819. — Position to be given in the plaster. — On the right of the figure, bad position; on the left, good position. — This figure shews that the position chosen by us : 70, 70, and 0 degrees, is the most favourable for excavating the acetabulum. — On the right, the femur is placed in an abduction of 90 degrees or more, that is, its axis is parallel to the plane of the table. The pole of the head strikes against the anterior part of the capsule, which it raises (bad position). — On the left, the femur is in the chosen position; the centre of the head obviously corresponds with the centre of the cavity, or rather a little in front of that point (good position).

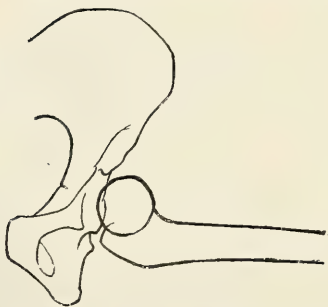


Fig. 820. — From radiograms. Bad position. — Abduction of 90 degrees or "hyper-extension", which gives at once, the same day, a tendency to the anterior relaxation.

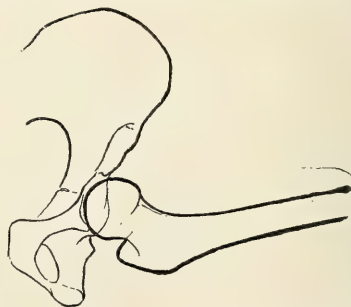


Fig. 821. — Good position. An abduction of from 70 to 80 degrees gives a very good reduction.

the leg itself, it is flexed at an angle of 90° to 100° on the thigh, and, consequently, the foot is brought back inwards, its inner border upwards.

The *plaster* is constructed in the way you already know (v. the construction of the apparatus in coxitis, Chap. vi), over a jersey.

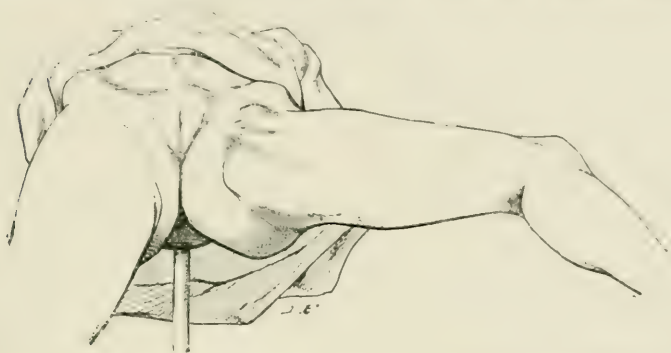


Fig. 822. — Bad position, or at least mediocre, of abduction at 90 degrees, or of hyper-extension.

with bandages and strengthening pieces (v. fig. 826 to 830).

Two or three bandages, 5 metres in length and 10 cm.

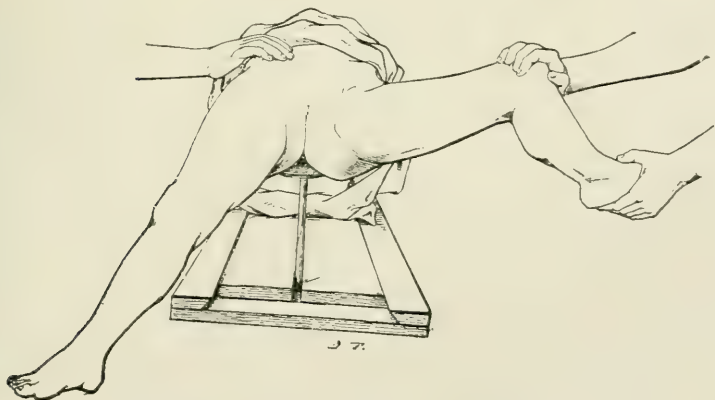


Fig. 823. — Chosen position. — Flexion 70°; abduction 70°; rotation 0°.

wide, are necessary for a child of from 2 to 4 years. One uses 3 attelles for strengthening.

The last bandage applied, one encircles with the hands the reduced hip, pressing especially upon its posterior part, so as

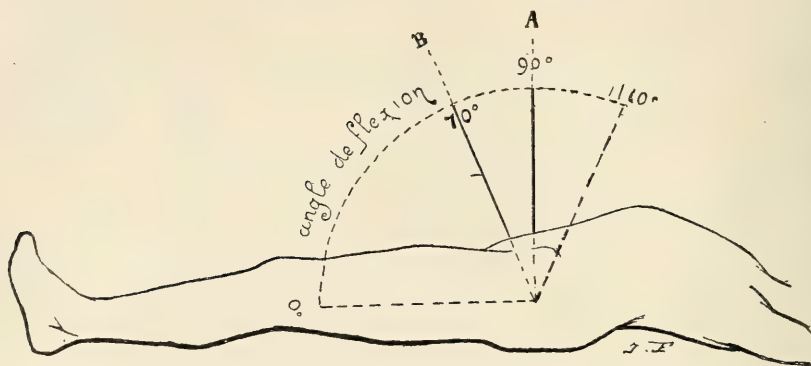


Fig. 824. — Plan of pure or direct flexion; — Vertical plane parallel to the vertical plane dividing the body into two halves, right and left. When the knee exceeds 90 degrees, when it is approximated to the abdomen, it is placed in forced flexion of 90 degrees + n degrees.

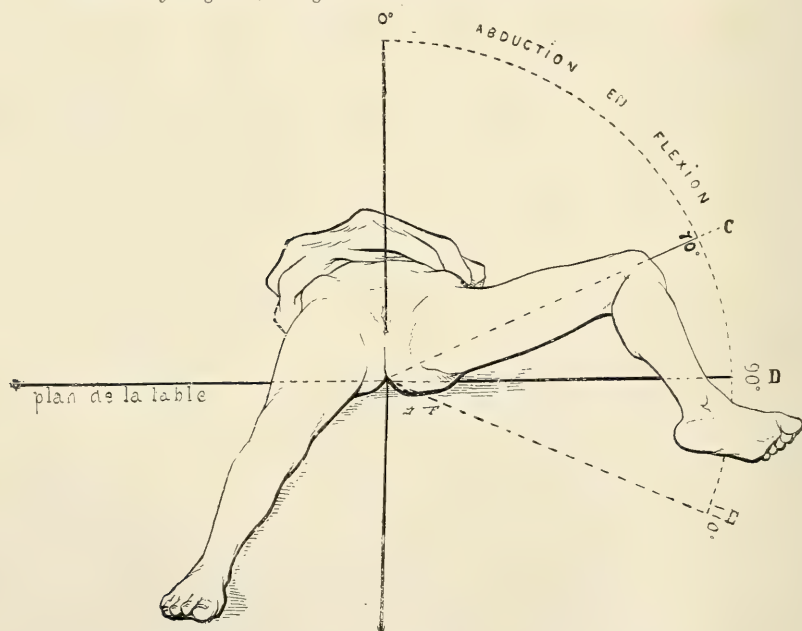


Fig. 825. — Abduction in flexion in the vertical transverse bicotyloid plane, or in a plane parallel to it (the subject recumbent). — It seems that the left knee, arrived thus in D, is in external rotation of 90 degrees, because the patella looks towards the child's head. In reality, the femur is at 0° of rotation for this position of the thigh (flexion of 90 degrees, followed by an adduction of 90 degrees).

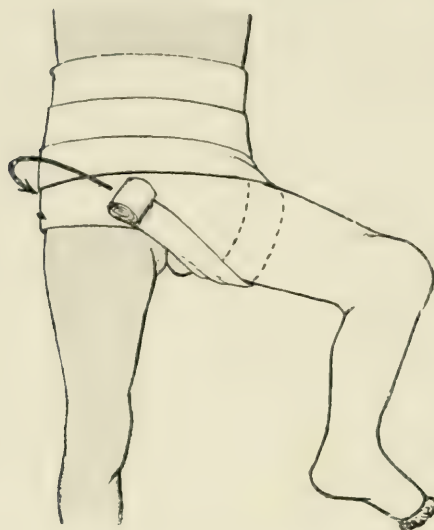


Fig. 826. — How one applies the bandages at the root of the thigh.



Fig. 827. — How one strengthens the plaster round the hip with a plaster attelle 80 cm. in length, 10 cm. wide and of 3 or 4 thicknesses of muslin.

to model the plaster over the trochanter; it is here a supplementary precaution. But do not be concerned: with the large plaster and the position we have mentioned, the reduction will be maintained very well, and the precaution of making a gutter on the plaster opposite the trochanter is almost superfluous.

Half an hour after the plaster has set, one trims it (v. p. 39).

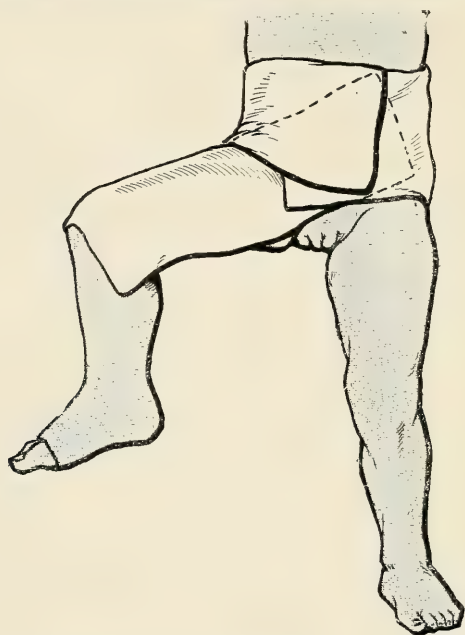


Fig. 828. — Strengthening the waist and the front of the thigh by two other supporting pieces.

3rd. Post-operative treatment.

The post-operative treatment is very simple¹. For several days, however, and especially several nights, children are a little irritable and nervous. Give a soothing draught.

1. *a.* A sub-cutaneous hematoma is produced sometimes, where the superior attachment of the adductor has been bruised or ruptured. Leave it alone; it will be reabsorbed spontaneously. Simply hollow out the plaster at this level; apply cotton-wool dressing.

Then, these few days passed, the child may be allowed to go away. Recommend the parents : 1st. to avoid constipation and 2nd. to prevent soiling of the plaster with urine. For this, one places impermeable canvas or non absorbent wool, over the apparatus; attentive mothers will manage very well to keep the plaster in good condition. Nothing else is to be

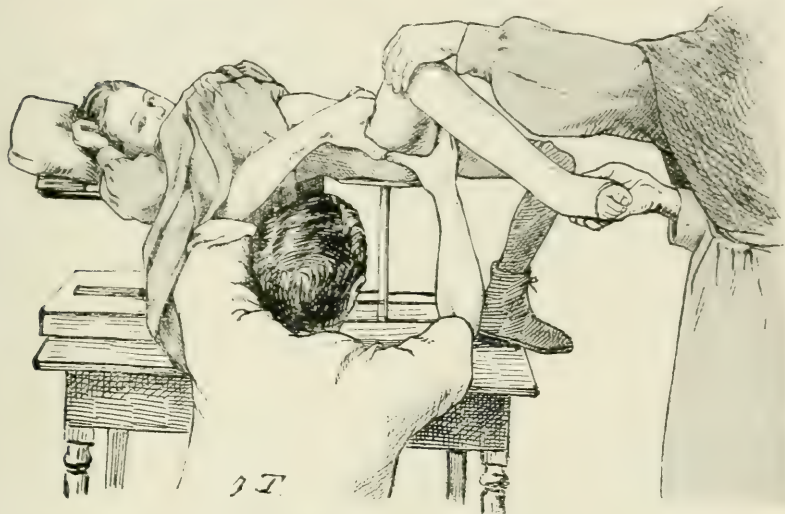


Fig. 89. - Modelling of the plaster apparatus. When the apparatus is finished, the limb is placed in the corrected position, and kept there by an assistant. The thumbs of the surgeon, which have not left their place during the application of the plaster, fashion a gutter behind the neck whilst the plaster is drying.

done for two and a half months. I have no need to tell you that the child must be kept at rest in the large plaster, which will not in any way affect his general health. — and which is safer, in order to make a good result certain, than to allow him his liberty to walk about with a small plaster stopping

b. It is necessary to inspect the toes for the first few days, with regard to circulation and sensibility (v. p. 40 and 41 on generalities). During cold weather, the free extremities of the toes should be enveloped in cotton wool.

c. Sores; the means of avoiding them (p. 65). The way to recognise and cure them (v. p. 72).

above the knee (as some surgeons do). The two and a half months passed, one removes the plaster and alters the position of the limb.

Second plaster, second position.

The alteration of position is made without chloroform. But, however, if the child is too nervous, employ anæsthesia.

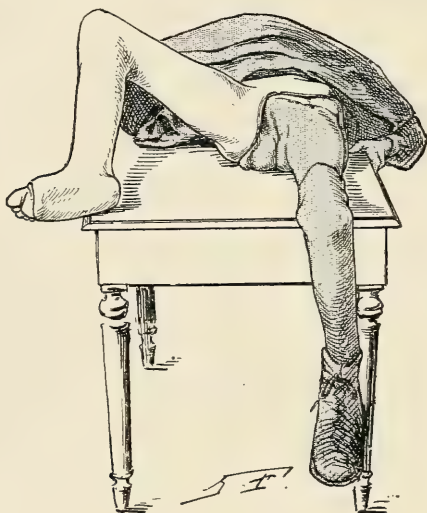


Fig. 830. — 1st plaster, 1st (chosen) position, 70, 70 and 0 degrees. — Plaster apparatus, seen from its inferior aspect.

Technique of the alteration from the first position to the second (fig. 831-840). — It is a question of bringing the thigh and the leg into the position indicated in fig. 840, p. 751, that is, of putting the lower limb: 1st. in extension in the plane of the table, or almost so (slight flexion of 15°); 2nd. in abduction of from 30° to 35°; and 3rd., above all, in **internal rotation** of from 55° to 60°.

This second position; then, may be formulated in this way; 15; 30; 60; namely, 15° of flexion, 30° of abduction, 60° of internal rotation.

There are several ways of bringing the leg from the first to the second position.

But remember only the following (fig. 838, p. 749). The pelvis being immobilised, an assistant makes traction on the foot and bottom of the leg, gradually and firmly, in order to arrive at the undoing of the flexion of the leg, which requires three or four minutes. By the same traction, he deflects the

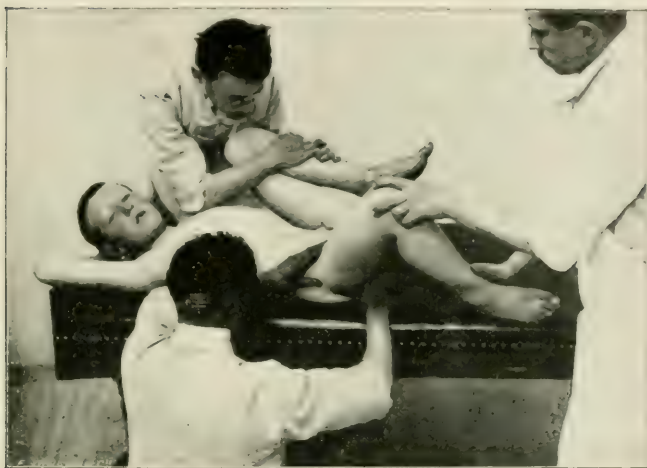


Fig. 831. — Right luxation. — The starting point for the alteration of position.

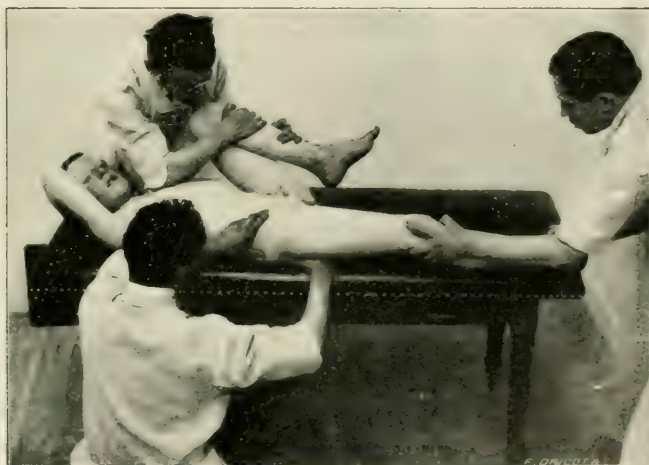


Fig. 832. — While the assistant pulls firmly on the foot and supports the knee (by bringing it very **gently** inwards), you yourself operate upon the **highest part of the femur**, in order to carry it into **internal rotation**. You will proceed **vigorously** and by rhythmic shocks (Right luxation).

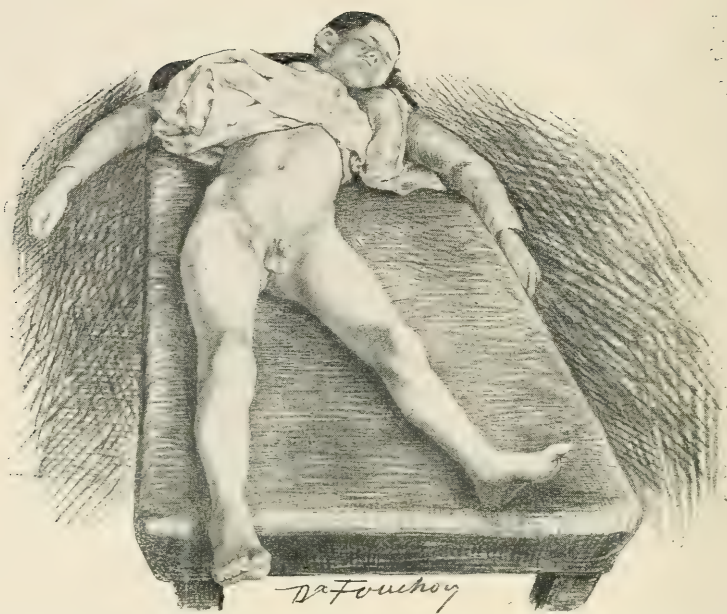


Fig. 833. — Left luxation. — This is the position with which one is content, too often, for the second and last plaster. It is a *grave fault*: it is necessary to reach a very marked internal rotation (see following figure).

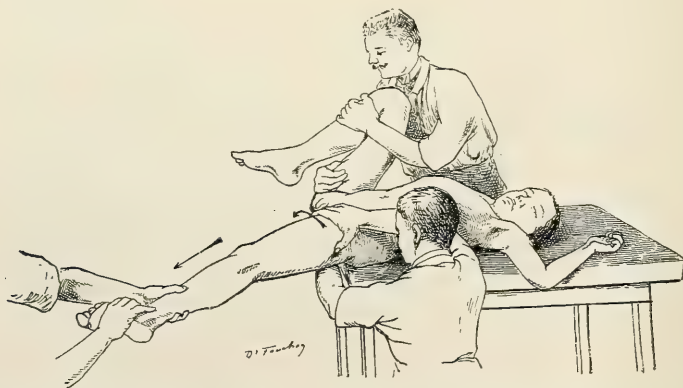


Fig. 834. — Left luxation. — How one obtains internal rotation: turn the limb round until one obtains a rotation of from 60 to 65 degrees.

thigh also, and brings the back of the knee on to the plane of the table or nearly so, making scarcely 15° of flexion. More than that, in pulling on the foot, he detaches also slightly the head of the femur from the iliac bone, which will prevent the head from striking too heavily upon the bottom of the acetabulum, in the rotation which one makes it undergo afterwards.

You will reserve to yourself the delicate rôle of producing internal rotation. The foot being all the while very firmly pulled upon by the assistant.



Fig. 835. — To explain the necessity of making **internal rotation**. — The contracted posterior capsule forms, after the first plaster, a posterior, very strong, ligament.



Fig. 836. — The necessity for internal rotation (*continued*). — If one carries the thigh into abduction **without making internal rotation**, the posterior capsule, being retracted, holds the trochanter to the iliac bone and the head of the femur tilts outside the acetabulum, as shewn in this figure.

you manœuvre upon the upper part of the thigh, not upon the knee, because, in acting upon the knee, you run the risk of a fracture¹ above the condyles.

Turn it round without ceasing, until you have placed the

1. If ever you fracture the bone, you will discontinue the manœuvres, apply a plaster and complete the correction three months later.

patella, not only pointing to the ceiling, but facing the **sound side**.

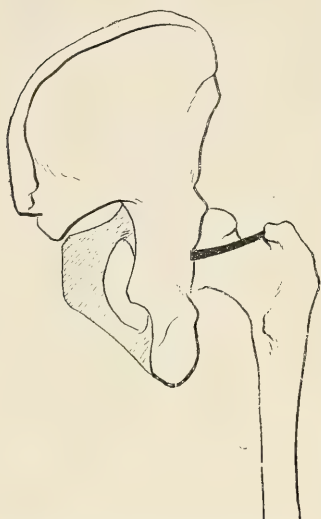


Fig. 837. — One sees **what is necessary to be done** to ensure the result; it is to obtain, by a **very marked internal rotation**, the stretching of the posterior ligament; then the head of the femur will remain in the acetabulum.

You must know that it will be necessary for you to take 8, 10, and sometimes even 15 minutes, to achieve this.

The thigh brought, at last, to an internal rotation of 60° , you give it 15° of flexion and 30° of abduction.

15° (of flexion), 30° (of abduction), 60° (of internal rotation) such is, I repeat, the formula of the second position.

One maintains it with a large plaster, which again takes in the foot, and that is all, for another two and a half months.

Treatment consecutive to the Removal of the Plaster.

After this, one takes off the second and *last* plaster.

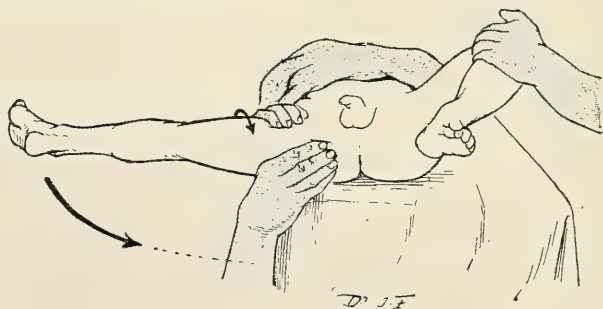


Fig. 838. — Alteration of position; first, one extends the leg gradually on the thigh, and, in continuing to pull upon the foot, one lowers the knee down to the plane of the table or nearly so; secondly, the two hands, grasping the upper third of the femur, impart a movement of internal rotation to it. At a third step, the limb is carried gradually inwards: it preserves, nevertheless, 30 degrees of abduction.



Fig. 839. — The same child as in fig. 816 : Radiogram taken after the manoeuvres of internal rotation : it remains to diminish the abduction (see fig. 847).



Fig. 840. — The second position and the second plaster. — Here the leg is in extension; but, as a rule, one puts it in slight flexion (of 15 degrees).

The limb thus set free, the patient continues in the recumbent position.

This rest will last 2 or 3 weeks: the period required for the child to get rid of the stiffness of his limb and to bring it back



Fig 841. — Three days after removal of the plaster. The child, on his frame, exercises himself by making movements of extension and flexion of the limb (reduced).

spontaneously to a position nearly normal (fig. 841); this you will help by massage of the entire limb.

Placing the Child on his Feet and Walking.

After three weeks, you will place him on his feet. He will hold on with the hands supported upon a table or the back of a chair, or against the rails of his bed. Eight days later, he will be able to walk round his bed alone, supporting himself by the rails. Afterwards, with the support of two hands holding his own, he will take his first walk in his bedroom (fig. 842 to 846).

Thus supported by two hands, he will walk at first for five minutes every hour, then ten minutes.

After three or four weeks of this regime, one replaces the hand support by that of two sticks (v. fig. 497, p. 475) and, a

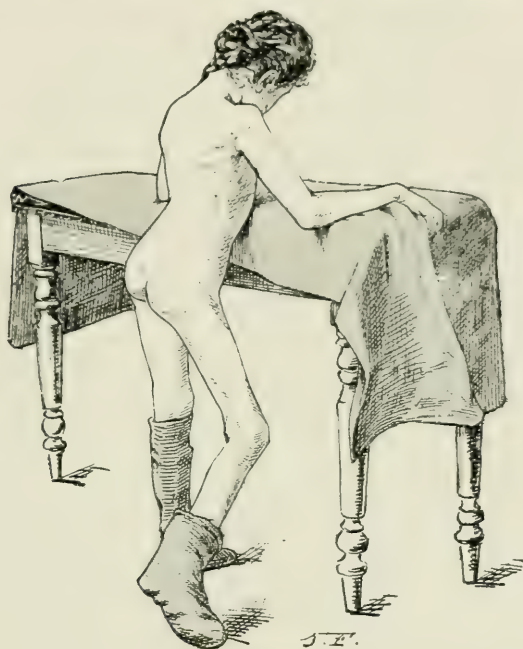


Fig. 842. — Placed on her feet. — Right luxation. The child holds her hands supported on a table and makes active movements of the affected leg, to efface the slight degree of flexion and abduction persisting, and to bring back the lower limb to the normal position.

little later, the child will walk alone with a stick (held in the hand on the sound side).

Lastly, two or three months after regaining the use of his feet, he will be able to walk without any support.

He had at first walked very badly, then passably, then well; he will finish by walking quite well, and a year after the reduction of the displacement, it will not be at all apparent;

the curé is complete (fig. 847), the lameness has vanished. One hastens the return of flexibility and strength of the leg



Fig. 843. — The same after a month of active exercises : the attitude of the body is almost perfect.

by massage and baths. The return to the normal condition may, strictly speaking, be produced without massage, in a child

on whom one is no longer in active attendance after removal of the plaster, — but the cure then is made more slowly, and it



Fig. 844. — The same. — A month later still.

may not always be completed. We are going to tell you why in the following pages¹. But, before doing so, we must describe the treatment of double luxations.

1. See pp. 760 to 768.



Fig. 845. — The same. — Photograph taken the same day as that in fig. 843. One can see that the right luxated leg, formerly much shortened (see fig. 780 and 782, photographed before), is now obviously longer than the sound leg.



Fig. 846. — The same a month later (six and a half months after reduction). — This much greater length of the luxated leg has disappeared gradually, the two legs are already obviously equal. See in the following figure (fig. 847), how the anatomical reduction in this child is perfect.



Fig. 847. — Radiogram of the child represented in fig. 816, 817 and 839.
Radiogram taken seven months after reduction.

B. TREATMENT OF DOUBLE LUXATIONS (AT 2 AND 3 YEARS OF AGE)

Still more than in the case of unilateral luxations, is it necessary to lose no time in the treatment of double luxations; because they will become still more quickly irreducible.

The choice of age for treatment is from 20 to 24 months. The manœuvres of reduction and the positions to be maintained (fig. 848 and 849) and, in a general way, the details of treatment, are the same as for simple luxation.

The treatment of double luxation is made on the two sides at the same time. Nevertheless, the two reductions will not be made on the same day, in every case.

If the first reduction has caused too much shock, one leaves the patient to rest, and one will only make the second reduction 8 or 10 days later¹.

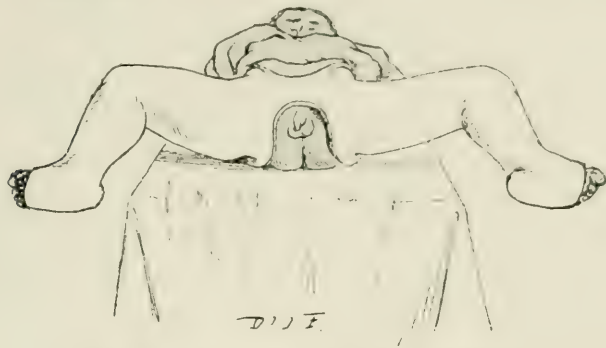


Fig. 848. -- The first apparatus for double luxation

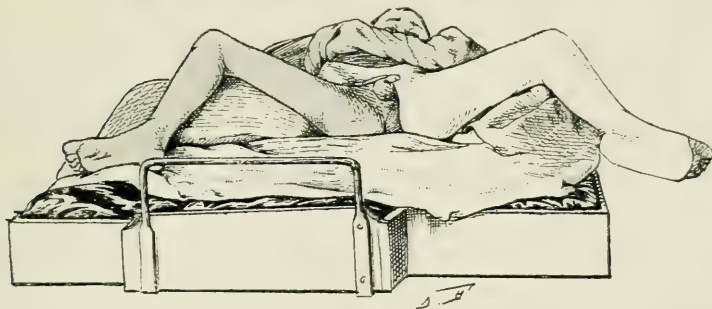


Fig. 849. — A child placed on a very large frame for double luxations; apparatus already removed from the right side (the first treated), maintained in the chosen position by means of a sand bag placed under the thigh (for 2 or 3 days), before proceeding to the alteration from the first to the second position.

On the contrary, if the first reduction has been very easy, one may perform the second at the same sitting. As a general

1. With this in view, I advise you always to commence the reduction on the left side (contrary to what is represented here, fig. 849), in such a manner that the left side may be maintained in the apparatus for from 10 to 20 days longer than on the right side.

I have observed, in fact, that the reduction requires (very often) to be maintained a little longer on the left than on the right.

rule, the alteration of position and the definite removal of the plaster are made the same day on the two sides.

CONSECUTIVE TREATMENT OF A LUXATION, SINGLE OR DOUBLE

We ought to return to the treatment which follows the removal of the plaster, and to mention the incidents which may be produced.

We said that, after doing away with the second and last plaster, the leg, left entirely free, but still at rest for two or three weeks, may return of itself gradually to a correct position; that is, that one may see it spontaneously get rid of abduction, flexion and internal rotation.

Normally and regularly this requires from 1 to 3 months.

Therefore you ought not be anxious if it retain for several weeks a certain degree of flexion, of abduction and of internal rotation.

It is better this should be so, and, **if it is**, you have **nothing** to do, outside what we have said above, with regard to education in walking.

And this will be the usual case if you have conformed to the technique we have indicated.

But you must know that this does not always happen so, and that the return of the limb to the normal position is made sometimes **too slowly** or **too quickly**, and also and especially, **not correctly**, that the thigh takes « a bad bend », a bad position, which may, in the long run, compromise the reduction of the head of the femur. This will create for us new obligations and need some special attention, by means of which, I hasten to say it, the reduction will be safeguarded without our having to replace the plaster or even having to retard the placing on the feet and the exercises in walking.

1st. Possible eventuality. — The **return of the leg** to the normal position is made **too slowly**; this is the **rarest** case in quite young children, of whom we are speaking.

If, two months after the removal of the plaster, you see that a noticeable degree (for instance half) of abduction, of flexion, of internal rotation, still persists, you will proceed to undo it and hasten the return of the leg to the normal.

This is how you would do that :

a. Against persistent abduction (that abduction easily seen by the limb operated upon being notably longer than the other) you will make extension on the sound leg, whilst making pressure on the leg operated upon with a sand bag placed outside and along it (as for hip disease with abduction).

b. Against flexion (which is easily seen by the persistence

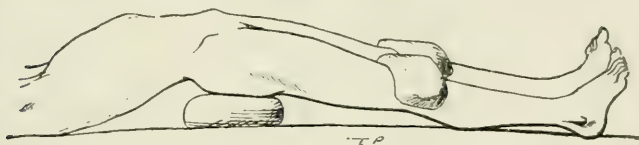


Fig. 850. — The method of correcting the tendency to flexion. The patient being laid on his back, a cushion is placed under his buttocks and a sand bag on each of his knees.

of a noticeable hollow in the lumbar region). you place the child on his face three or four times a day for half an hour each time, and you will place on both buttocks a weight of from 8 to 10 kilograms, whilst the knees are raised by a cushion: or, the other way about, the patient being laid on the back, you will raise the buttocks and place the weights on the knees (fig. 850), which is a little less efficacious, but, on the other hand, may be continued day and night.

c. Against internal rotation (which turns the patella inwards and makes the child walk badly on the point of the foot), you strive to overcome this by surrounding the limb entirely, from trochanter to toes, with Velpeau, and fixing it afterwards in external rotation with pins attaching the bandage to the canvas of the mattress (v. fig. 853).

These simple means are employed at night and during the day, in the interval of the exercises — until the result is obtained (about two months).

2nd. *Eventuality*. — The **return to the normal** has taken place, or **takes place, too suddenly**; *this is seen more frequently* than the first eventuality, in very young children whose joints are seldom fixed in the position of the second apparatus.

It is thus that you will very often see that position lost completely in a few days, and sometimes in a few hours, after the removal of the plaster. In less than twenty four hours in

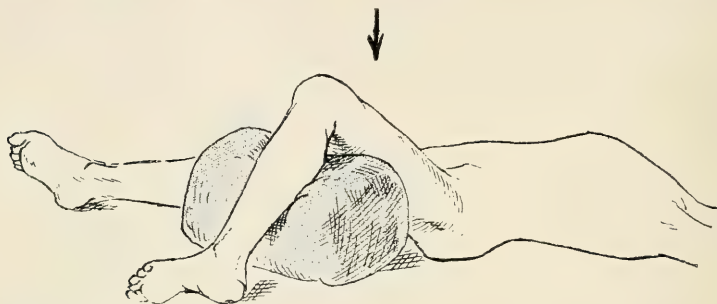


Fig. 851. — Method of combatting the tendency to anterior relaxation, replace the leg in the second position of the second plaster and keep it there with a cushion and straps, or some turns of Velpeau bandage, not shewn here.

certain cases, flexion, abduction and internal rotation have already disappeared.

If that is so, this is what you will do, this is how you will contend against this too rapid return to the normal, which should make you fear that the hip, too mobile, too loose, not sufficiently enclosed in the acetabulum, will soon be carried in the opposite direction to that of the second plaster, that is to say, in abduction and external rotation, which will compromise the stability of the reduction.

a) If **the flexion has undone itself too quickly or too completely**, for instance in a few days or a few hours, *which is recognised* by there being not only no lumbar cavity, but **by the head pointing in front, at the fold of the groin**, in this case, I say, you re-establish the flexion of the thigh by placing a cushion beneath the knee in order to raise it (fig. 851), and you

preserve this position night and day (postponing for some weeks the first exercises in walking).

b) If the **internal rotation** has become undone immediately, and especially if a **tendency to external rotation**

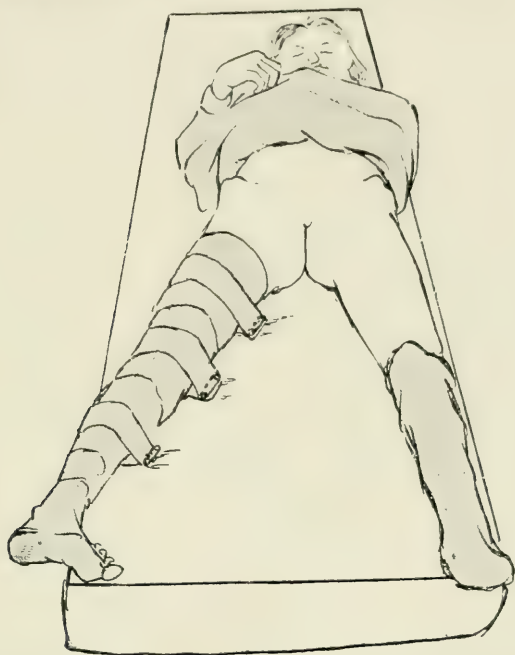


Fig. 852. — To overcome the tendency to anterior relaxation, make internal rotation with turns of Velpeau bandage which one pins to the mattress. By sitting the patient half up with cushions placed under his back one may realise that flexion of the thigh is more comfortable than the attitude shewn in fig. 851, to obliterate the projection of the head at the fold of the groin.

already exists (*which causes the head to point in front* at the fold of the groin and a **little outside** its normal position, at the same time that the *trochanter* ceases to be evident at the external surface of the hip and is *carried backwards*, and even sometimes backwards and inwards, against the acetabulum, in which case the reduction is not maintained absolutely perfectly). You endeavour to overcome this tendency to external

rotation by a proceeding analogous to that which answers in overcoming the tendency to internal rotation (see above), that is, you bandage the entire lower limb with a Velpeau bandage, and fix it in internal rotation with pins holding

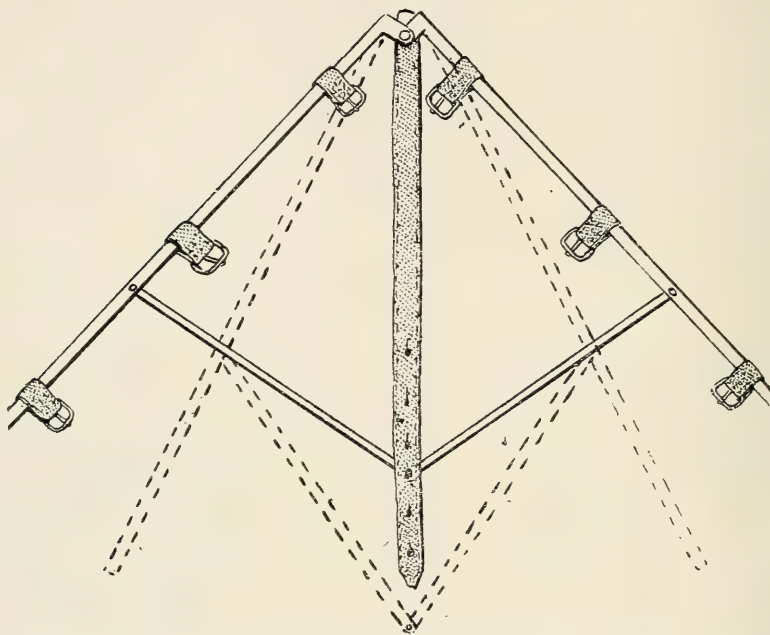


Fig. 853. — A very effective and practicable method, applicable by the parents, for making at will internal or external rotation of the leg during the night (after the plaster has been done away with). Over the leg enclosed in Velpeau bandages (fig. 854), one pins from above downwards a strip of canvas. Then, the curtain rod of the bed is fixed to the mattress with four metallic buckles. The leg is drawn towards the curtain rod by three small bandages with buckles attached to the strip of canvas.

This arrangement is applicable to simple luxations as well as to double luxations.

the bandage to the canvas of the mattress (fig. 852 to 855).

c. To contend against the **inclination to adduction**, which may in the long run, remove the head of the femur from the bottom of the acetabulum (as was produced in coxitis with adduction), especially when the adduction is associated with external rotation, — a *tendency to adduction which you may recognise*, as in coxitis,

by the limb shortening itself and *by the great difficulty in moving the knee outwards*. — in order to contend against adduction, I say, you fix the limb with pins, as far as possible from the median axis of the body — or make use of the arrangement shewn in fig. 855.

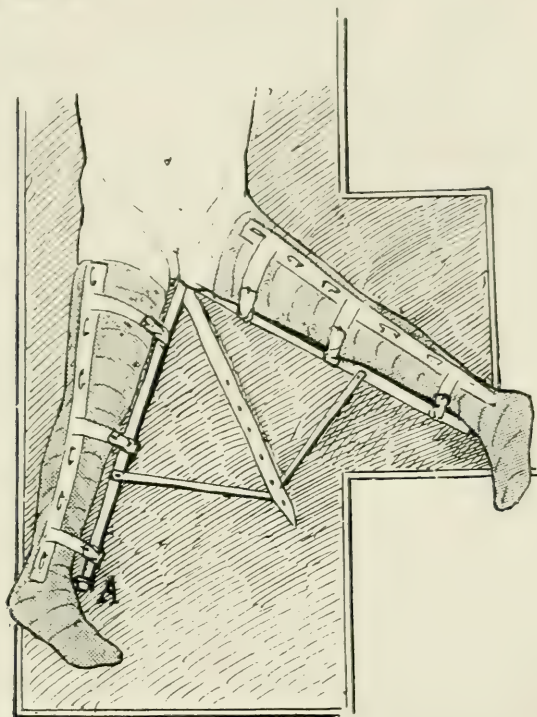


Fig. 854. — The small apparatus of the preceding figure applied to the patient, who rests on his frame.

One can give to each limb whatever position one wishes. The external rotation and abduction are, here, very marked on the left and almost absent on the right.

One may, with care, attain at the same time the triple objective of carrying the leg into flexion, abduction and internal rotation by giving the position indicated on p. 762, fig. 851.

One succeeds in this way in opening up the acetabulum and in retracting the anterior capsule. There one has a first

means of attaining the end which is that of improving and perfecting the reduction.

But there is a second means, still better, of attaining this objective; it is to carry the thigh at first into flexion at 90° , then, from there, into abduction as far as possible (see fig. 856), that is, instead of replacing the limb in a position analogous to that in the second plaster, one places it in a position near to

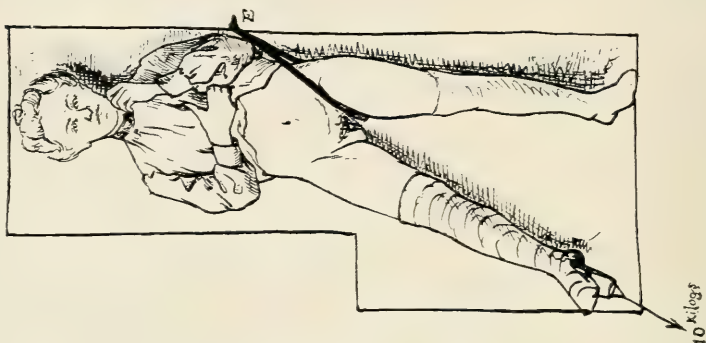


Fig. 855. — Method of correcting the tendency to adduction (continuous extension of from 8 to 12 kilograms, with a perineal band for counter extension on the sound side). One has the frame enlarged on the side of the luxation.

that of the first plaster; one arrives, by this method, at some excellent results¹.

This second manœuvre, this second position, is then, more

1. One can understand how this position corrects the tendency to adduction and hyper-extension of the thigh. But one sees less easily how it corrects the tendency to external rotation. Well, this is how it is. Without taking into account that which one contributes in lengthening the adductors, which are slight rotators outwards (Duchenne of Boulogne), one arrives at it especially because one retracts the anterior capsule with the flexion made, and one increases the hollowing out of the acetabulum by the abduction. And, if one flattens the head against the acetabulum, and if one forces it inwards, one prevents, by so doing its being replaced in external rotation, which could only happen by the head becoming slightly disengaged from the acetabulum.

In other words, the more we make the reduction perfect (and one arrives at it more quickly and better by the second proceeding) the more we shall be protected, not only against a posterior luxation, but even an anterior luxation (of which the tendency to external rotation is only the first degree).

efficacious than the first. It has only one other inconvenience, that of puzzling the parents. They at once imagine that if you return to the first position instead of retaining the second, it is because you have been "unsuccessful" which is not true.

It is not true, indeed, but nevertheless, to warn the parents against this impression, against which they cannot help themselves, it is necessary for you to take care, *before removing the*

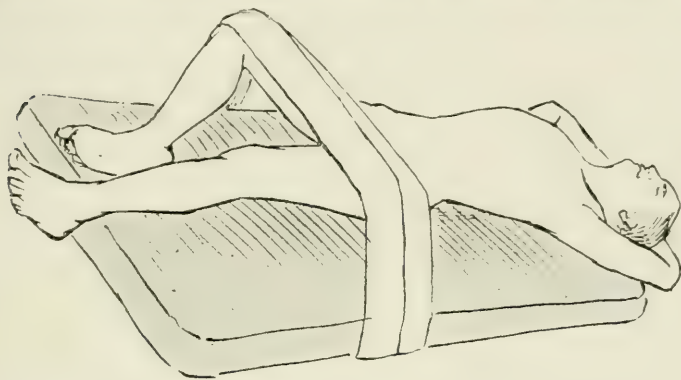


Fig. 856. — To overcome the tendency to posterior relaxation, fix the leg at night in forced abduction (that is, in an analogous position to that of the first plaster) with some turns of Velpeau bandage passing round the frame on which the child sleeps. A new bandage of elastic crêpe added each evening increases the degree of abduction. One carries this gradually to 80 degrees and even 90 degrees (after having flexed the thigh at 90 degrees).

second plaster, to warn them that you have to give to the leg, for some weeks, sometimes the position of the first plaster, at others that of the second position, according to the indications for the time being.

You will thus reassure them beforehand, by adding that this will be done with Velpeau bandages (v. fig. 856) and no longer with plaster, as in fig. 857; which will not delay in any way the placing of the child on his feet and taking exercise in walking.

Moreover, you will commence by using the first process which often suffices, and you will not return to the second for some days later, when the first proceeding has not given you entire

satisfaction, that is, when the most internal point of the head rests distinctly **outside the artery** (instead of being found, as in the normal position, under the artery and even slightly inside it).

Duration of the treatment. — You will preserve this attitude (always without prejudice to the walking exercises) for from six to eight weeks.

Then you leave the leg to return of itself to the normal position. According as, this time again, it returns too slowly or

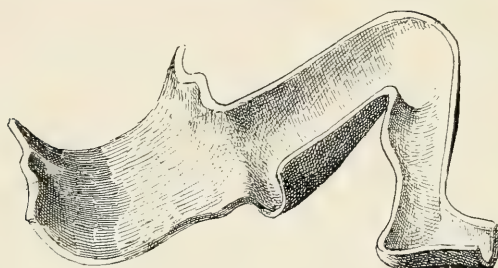


Fig. 857. — If the head moves a little and the excavating of the acetabulum should appear insufficient, one replaces the child for a few days, or even only for a night, in this splint. One keeps it in position with a muslin bandage.

too quickly, you will encourage, or you will counteract anew its return in the way indicated at the beginning of this chapter.

We may add, to make this clear, that if a **genu valgum** or a genu varum supervene, it would be easy for you to overcome it with a wooden splint and some turns of Velpeau bandage, or, if need be, a plastered knee-piece kept on for several weeks, and with which the child might continue to walk (v. p. 613, fig. 656).

Active Exercises.

With regard to active exercises, there is nothing, or not much, to be done, outside walking exercise, in very young children who understand imperfectly what is required of them.

In older children, they are easily made to walk at our command, with the leg outwards, backwards, in external or

internal rotation, etc. But, for the very young, rely almost entirely on the passive manœuvres described above.

We have intentionally not spoken of **mobilisation of the hip**: you will never use this. The movements ought to return and will return quite of themselves.

Results of the Treatment of Congenital Luxation

The results today are *marvellous* (see fig. 858 and 859; 793, 794 and 847).

Ten years ago, they were quite lamentable. We obtained scarcely once in ten times a durable reduction, and, in all the other cases one had a relapse, especially forwards, that is, an anterior "transposition".

But today success is a certainty, one may say, when one operates on children of six or seven years of age.

And one will soon arrive, thanks to greater experience¹, at having a whole series of 100 cases without a single relapse².

1. Our own covers already over 1813 congenital luxations (treated by us); see, for details, results and statistics, our book on "*La luxation congénitale*" (Masson), Chap. xv, p. 228.

2. Here are the **incidents** and **accidents** possible during or after reduction, possible, but extremely rare (refer to the same Chap. xv of our book on "*La luxation*").

a. Operative Shock? — Not to be feared, provided that your anaesthesia is well looked after (v. Chap. II) and that your manœuvres of reduction do not exceed 15 minutes for children of less than five years, and from 20 to 30 minutes for older children.

b. A fracture? — See the notes on pp. 749 and 793.

c. A paresis or paralysis? — Without its being imputable to any fault in technique, one may, strictly speaking, under exceptional circumstances, notice, on the patient awakening — after some very arduous manœuvres of reduction, **in old or very obstinate luxations** — a paralysis of the leg, which is generally incomplete and localised in the foot. Fortunately, it always yields, I believe, to the galvanic current (v. p. 663) combined with massage, baths, and active exercises attempted by the patient. Cure is effected in from 3 to 10 months.

According to observations reported up to the present day, the paralysis has simply retarded the functional cure of the patient.

Rest assured that one never observes paresis, even temporary, under 6 or 7 years of age (simple luxation) and 4 or 5 years (double luxations), **the only cases you non specialist practitioners, ought to treat.**

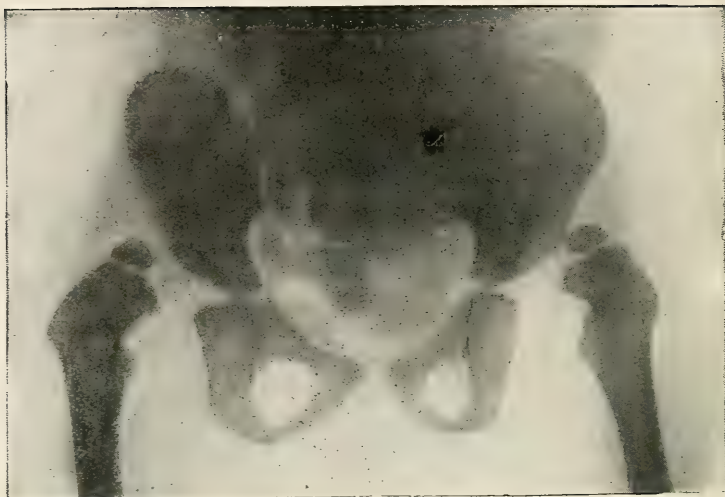


Fig. 858. — Double congenital luxation.

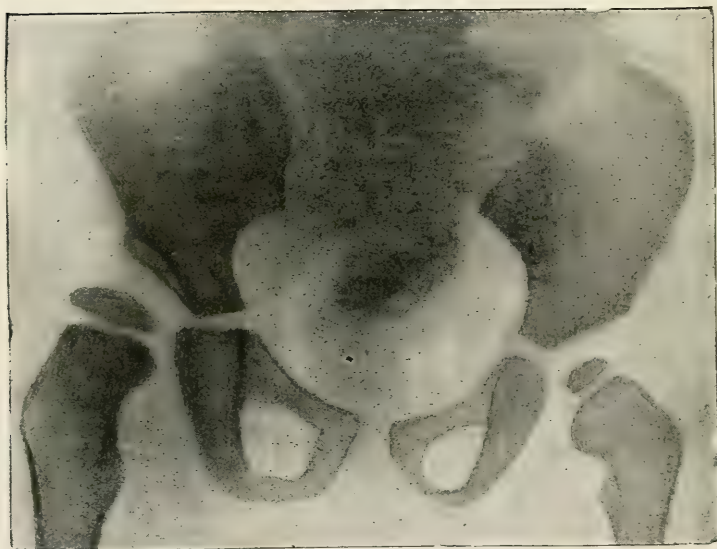


Fig. 859. — The same 8 months later.

We have already obtained, on our own account, three such series — 100 cases in succession, without a single relapse — just as a good number of surgeons are able to produce whole series of 100 cases of radical cure of hernia or of simple ovariectomies, two operations which formerly, like the treatment of luxation, produced so many failures and which today are always successful.

II. — TREATMENT OF LUXATIONS OF MORE THAN 5 OR 6 YEARS' STANDING.

We have seen that one succeeds immediately in reduction *without any previous preparation*, when it is a question of a luxation of two or three years' standing. But that is not usually so in luxations which have reached eight, nine, ten and twelve years' duration.

Before indicating the course to be followed in the presence of these difficult cases, we will rapidly recall the nature of the obstacles to be overcome. The obstacles are three in number :

1st. THE ELEVATION OF THE HEAD OF THE FEMUR in the buttock where it is held by muscular or tendinous contractions or shortening, and sometimes by adhesions of the capsule to the periosteum of the iliac fossa.

2nd. THE SHRINKING OF THE CAPSULE at its middle or at its internal part (v. fig. 860 and 863).

3rd. THE PARTIAL CLOSURE OF THE ACETABULUM by the capsule (fig. 862 and 863).

You will overcome the last two obstacles here (as in cases of very young children), on the day of the intervention, by the special manœuvres for reduction, moving the head of the femur for some

d. A *relaxation*? — In this case, you perform the reduction again (v. p. 784).

e. *Bullæ, bed sores, or nutritional troubles of the toes or of the foot*? — To avoid these, it is necessary to inspect the toes very often (colour, temperature, sensibility) for some days, especially in cold weather. — If anything suspicious occurs, split the plaster in front up to the knee, separate the sides and proceed in the way described on p. 68. If necessary, you remove the plaster from the toes to the calf, and replace it by a slightly compressive wool dressing, permitting of frequent and complete examination.

time and in a variety of ways, in all directions, against the narrow shrunken capsule, so as to widen it (fig. 864 and 865). One succeeds in widening it almost always up to twelve or fifteen years.

But the first obstacle indicated above demands, in order to overcome it, a special **pre-operative treatment**.

In truth, at six, seven or eight years, this pre-operative treatment may be carried out **without preparation**, at the beginning even of the sitting for reduction, by manœuvres of **forced traction**, under chloroform, obviously. But, after a certain age, about eight or nine years, it is usually indispensable, and always extremely useful, to make, **at a longer or shorter time before** the day of the operation, a *continuous extension* of the limb.

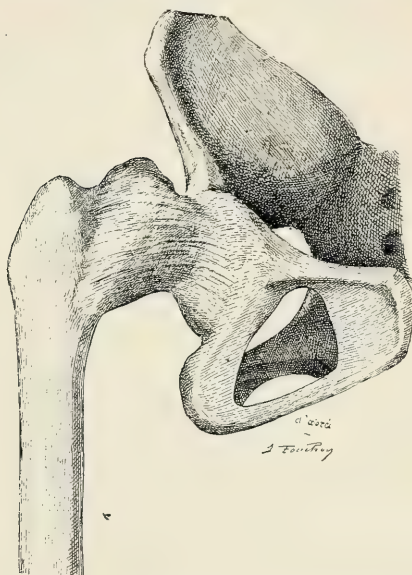


Fig. 860. — Shrinking of the capsule between the head and the acetabulum. Exterior view.

Continuous Extension.

The **duration** varies from several weeks to several months, and its **amount**, from 5 to 20 kilograms, according to the **age** of the child, the degree of **shortening**, and the **variety** of the luxation.

The continuous extension should be least, for instance, in children of from seven to eight years of age, and, in the case of shortening less than 3 cm., or in luxations of the **anterior** or **sub-cotyloid variety**, that is, where **the head** is in **front** of the **acetabulum** or **directly above it**.

Extension will be much more serious in the opposite conditions; the child older, the shortening greater, or the luxation of the **posterior variety**, that is, where the **head is behind the acetabulum** and the trochanter a little in front (the femur having undergone in these extreme varieties a movement of internal rotation).

We described, on p. 417, the method of making extension and counter-extension.

As to the criterion of its duration, one continues it until the upper margin of the trochanter is not more than 1 or 2 cm. out of Nelaton's line (fig. 866). [See our book on **Congenital Luxation**, p. 71. Masson].

Forced Extension without Preparation.

This is done, as I said, at the very beginning of the sitting for reduction.

It's technique. — One uses a windlass and tackle.

Counter-extension. — The patient is held by a hank passing round the groin on the luxated side and fastened to the wall (fig. 867 and 868).

Extension. — One passes two hanks slipped round the ankle: the buckles of the bands are superimposed and the two knots are placed one above each malleolus, to distribute the force of the traction equally between the two sides.

One places a **dynamometer** between the hook of the tackle and the hanks, joined together by a cord.

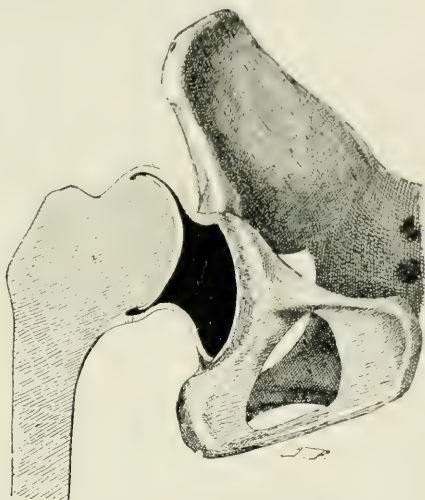


Fig. 861. — Interior view of the shrunken capsule.

One makes traction up to 80, 90, or 100 kilogr.¹ for five eight or ten minutes.

After which, one removes the entire apparatus, — and one

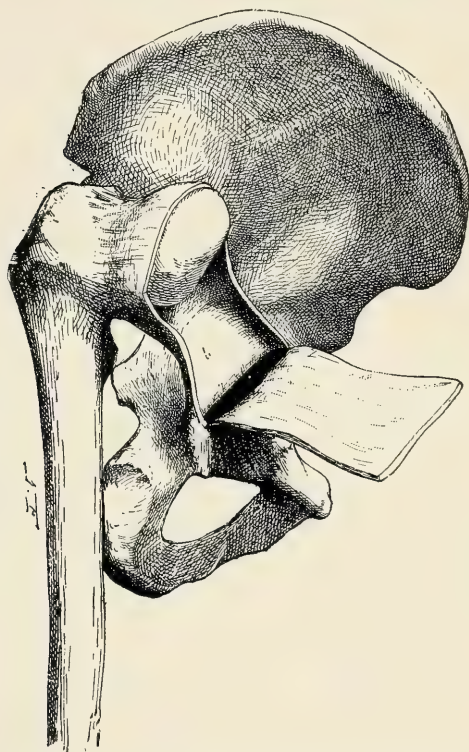


Fig. 862. — A personal case of luxation of ten years' standing, where the orifice of entrance to the acetabulum was exceptionally narrowed. — The anterior capsule, very retracted, has transformed the orifice into a button-hole so narrow that it was impossible to admit the head of the femur. We were obliged to have recourse to our surgical operation (see further on p. 807).

sets to work to stretch or rupture the adductors, as has been explained above (v. p. 726) in order to pass on afterwards to the reduction itself,

1. Above 150 kilogr. may entail a slight risk of paralysis. See note 2, p. 769.

We will resume. — Before reduction, one ought to make the following **preparatory** manœuvres :

a) For children of from 5 to 9 years (with slight shortening, with the head of the femur placed in front of the acetab-



Fig. 863. — The same during the attempt at reduction (schematic cut).

ulum, or quite against the anterior superior iliac spine); 1st forcible extemporaneous extension, 60 to 80 kilogr., for 8 minutes; kneading of the adductors. — Preliminary continuous extension is not indispensable here.

b) For children slightly older, or with great shortening, or with the head of the femur backwards on the buttock, some distance from the antero-superior iliac spine : 1st. continuous

extension of from three weeks to three months, and of from 8 to 15 or 20 kilogr. (according to the age and the shortening); 2nd. forcible *extemporaneous* extension of from 80 to 100 kilogr. for ten minutes; 3rd. rupture of the adductors.

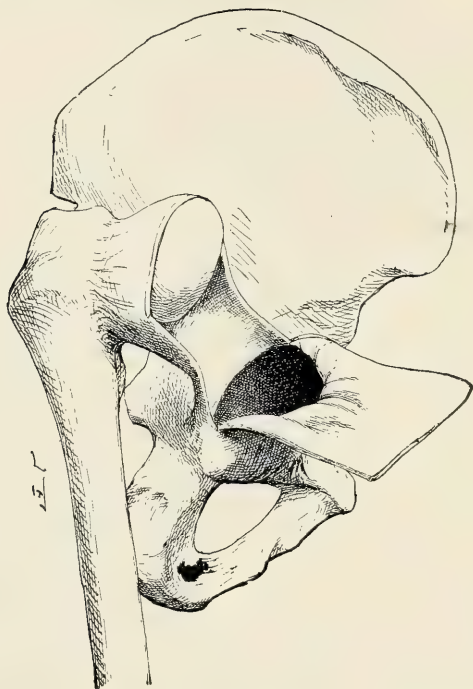


Fig. 864. — How the reduction will become possible in cases slightly less obstinate than the preceding. — The action of the head in the manoeuvres has gradually transformed the linear slit into an orifice sufficiently wide.

Reduction.

The manoeuvres of reduction do not differ from those we have described for the easy cases of younger children (see p. 728); but here, you will insist more on employing **a longer time** and **greater force**, — you being assisted by two or three strong assistants.

There should be two in order to act upon the thigh and knee,

and also two (you will employ four thumbs instead of two in order to act upon the head of the femur and push it towards the acetabulum).

One understands that it is impossible to express the ma-

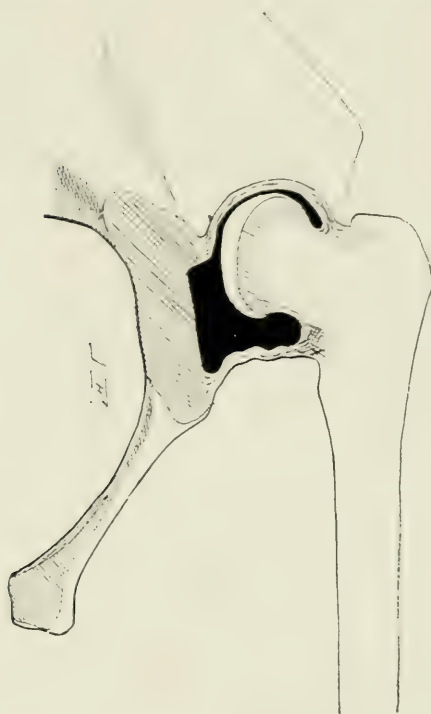


Fig. 865. — The same (schematic cut).

nœuvres in immutable mathematical formulæ. We can indeed give only some directing notions and indicate some manœuvres which have already been proved in hundreds of cases.

The three typical manœuvres (v. p. 729), you will know how to modify and vary in the course of the operation, according to circumstances, as you do instinctively when you have for instance, a rather difficult dislocation of the shoulder to reduce.

Here is a variant, a fourth manœuvre, sometimes useful in certain cases of malformation. One begins, not by flexion of the femur at 90° , but with a still stronger flexion — 110° , 120° , 130° — and one passes from that to a similarly forcible abduction of more than 90° ; that is, one carries the knee below the plane of the table, at the same time towards the axilla.

If you do not succeed after trying successively the four methods, recommence very patiently the whole series.

I have in this way seen the first manœuvres succeed, when repeated, after the three others had been tried in vain.

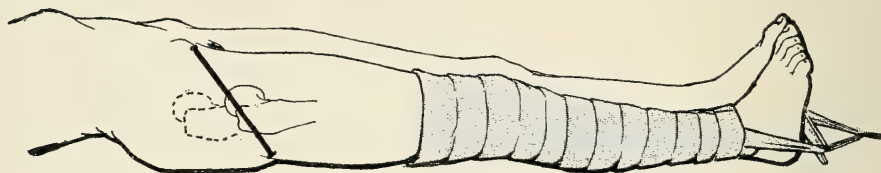


Fig. 866. — Depression of the femur under the influence of continuous extension. — The dotted line represents the old relations of the head and of the trochanter with Nelaton's line; the plain lines represent their actual relations after extension.

These attempts may be **prolonged**, without inconvenience, for **half an hour** (except forcible extension). But I **do not advise** you to **exceed** this limit; they may cause, by persisting further, too violent a shock to the patient.

If you have made no progress after half an hour's efforts, discontinue them for the time being. The patient should be replaced in continuous extension for two months longer.

Then you will recommence. If you are disappointed the second time, you will give up the reduction by orthopædic methods.

There is nothing to add to what has been said above, for the easy cases, *as to the diagnosis of reduction, the position in which it is necessary to maintain the patient and the alteration from the first into the second position.*

Nevertheless, *à propos* of the position to give in the first plaster on the day of the reduction, it is necessary for us to note here

that there is such a case, exceptional of a truth, where the reduction does not maintain itself if we give to the femur the classic position, the best position, which is, as you know, 70°.

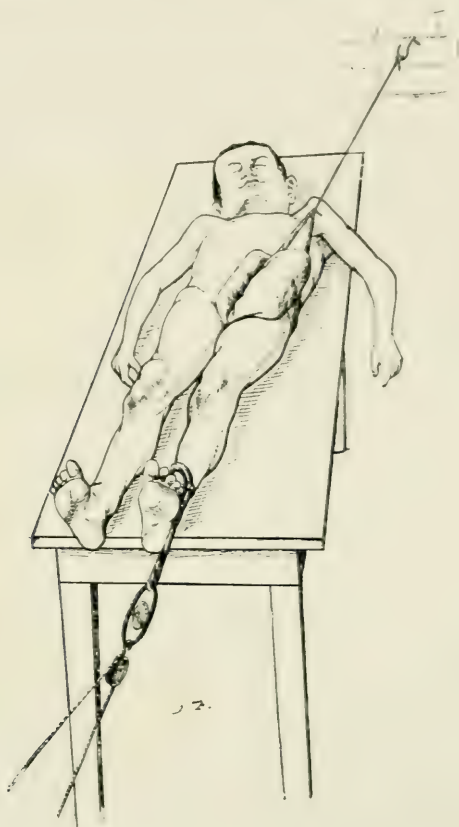


Fig. 867. — Forcible extemporaneous extension. — 1st The **counter extension**: a hank is placed at the root of the limb (protected by a cushion of cotton wool) and is attached to a hook fixed in the wall, behind the patient. 2nd The **extension** with another, or **better, with two hanks**, slipped as a sliding knot round the ankle.

70° and 0°, — 70° of flexion, 70° of abduction, and 0° of rotation.

It does not "hold", the head does not remain in the acetabulum unless we place the femur in a **forcible** flexion and abduc-

tion at 90° or more, that is to say, so that the knee ought to be raised towards the trunk, and, at the same time, carried below

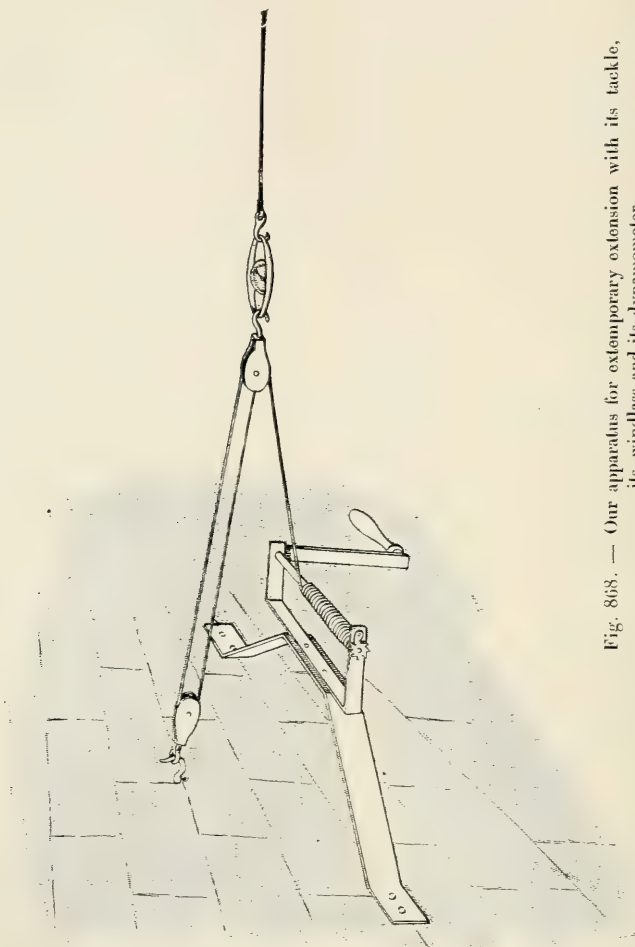


Fig. 868. — Our apparatus for extemporary extension with its tackle, its windlass and its dynamometer.

the plane of the table, as in the manœuvre figured here (fig. 869). It is then, “*a position of necessity*” which we ought to accept, but which we only accept provisionally.

We fix the thigh provisionally, by a plaster, in this attitude — the only one where it “holds” — for about three weeks.

But we do not preserve this position longer than is necessary



Fig. 869. — Forcible flexion of the thigh in abduction in a transverse vertical plane, parallel to the vertical transverse plane of the acetabulum, where one sees the track followed by the right thigh in order to arrive at this position of forced flexion and abduction.

for the head to be slightly fixed, at the point very near to that where it ought to be; this **time will not exceed three weeks.**

After that, we place the thigh at 70° , 70° and 0° . the best position, the ideal position, in which this time, it “holds”; and, from this time, the hollowing of the acetabulum will be made under very good conditions. There will then have been a delay of three weeks only — in this very bad case — in arriving at a perfect cure.

Consecutive Treatment. — This does not differ essentially from that which we have indicated for very young children.

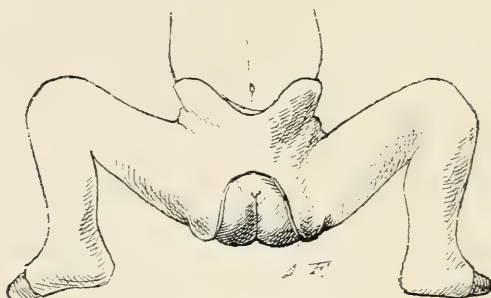


Fig. 870. — Position of necessity (temporary); forcible flexion and abduction. — The knee in forced flexion; more than 90 degrees, and forced abduction — more than 90 degrees — below the plane of the table and against the flank (see also fig. 825).

But here, in children of more than six years, one may obtain much from well directed movements and *active exercises*; several times a day, one makes the child carry the limb in different

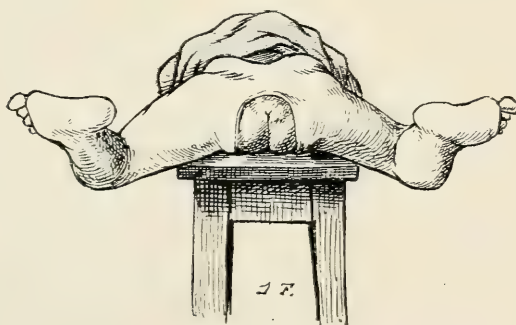


Fig. 871. — Position of necessity. — Knee below the plane of the table, to shew the forced abduction (wrongly called hyper-extension).

directions indicated in each case, that is, in directions opposite to the vicious attitude it has a tendency to take.

From one to two years after the day of the reduction, the functional result is achieved. It is not always so perfect as in

very young children. It may happen, in the unilateral luxations reduced after seven years, that a certain amount of stiffness of the hip persists, and we ought to add that this is the rule for bilateral luxations above that age.

Combat this stiffness by massage, baths, and active exercises, but rely more **upon time**, to overcome them, and learn to **resist** the very natural **temptation to effect** forced **mobilisation** of the joint. You may in that way do more harm than good (from the point of view even of return of movement).

Bilateral Luxations of upwards of five years Standing.

The treatment of the two luxations will be made **at the same time** (v. p. 758); but the two reductions will not generally be made on the same day. One allows an interval between them of from 15 to 20 days.

Their prognosis. — They are, as you know, more difficult to reduce than unilateral luxations. A bilateral luxation of four years standing presents as many obstacles to reduction as an unilateral luxation of seven years; and a bilateral luxation of six years standing gives as much trouble as an unilateral luxation of nine or ten years.

Therefore, for double luxations, the age limits indicated for the treatment of simple luxation ought to be lowered by at least two or three years, all things besides being equal.

Scarcely ever treat double luxations over seven years — especially you, practitioners not specialists.

Past that age, you would have too few chances of reducing them, and your functional results would be too often imperfect, in the sense that you would see an articular stiffness persist in your patients, so troublesome as to render walking defective.

RELAPSES AND RELUXATION

We have indicated the technique which should lead to real and durable reductions.

We have also mentioned, *à propos* of consecutive treatment,

the methods of improving and rectifying the reduction, when it has not remained perfect after removal of the plaster.

But it would be rash, however, to hope that you will never have a relaxation,

1st. Because a case may occur where the conformation of the bone may be so defective, or the hollowing of the acetabulum so slow, that relaxation will be very easily produced. Be reassured, however; it is quite an exceptional case, and one may



Fig. 872. — Tendency to anterior relaxation.



Fig. 873. — Anterior relaxation. — 1st degree.



Fig. 874. — 2nd degree. Moreover the femur has been raised.

say that there scarcely ever exists a luxation where one can not, with a good technique, place a relapse out of the question.

2nd Especially for this reason, exceedingly simple, and which will always hold good, that... *errare humanum est*; we are none of us infallible, and in spite of everything, in spite of error being theoretical avoidable, one will commit, some time or other, in practice, a technical fault, not recognised or not repaired in time.

A. — ANTERIOR RELAXATION

This is the most frequent.

One may distinguish **three degrees** (fig. 872 to 874) :

a Head **forwards** and **inwards** (its centre is within the antero-posterior plane, passing through the middle of the trochanter);

b) Head **directly in front**, or even in the same antero-posterior plane as the trochanter;

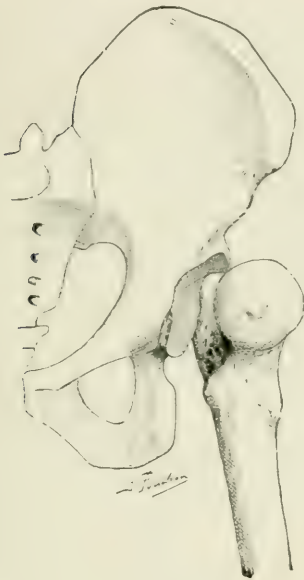


Fig. 875. — To shew that the transmission of the weight of the body is not through the head, but solely through the posterior angle of the trochanter supported upon the acetabulum.

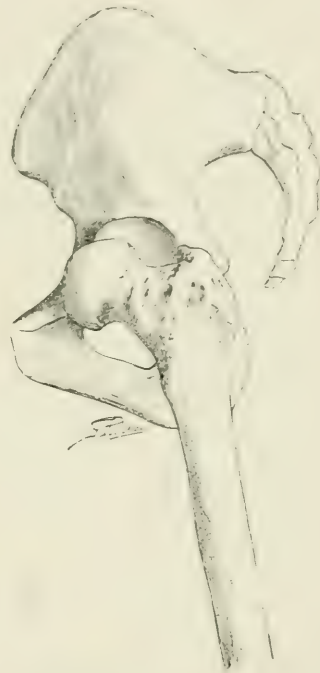


Fig. 876. — Slight anterior relaxation.

c) Head **in front and outside** the trochanter — in which case the head is felt under the skin on the external surface of the hip — whilst the trochanter is placed backwards and inwards, quite against the acetabulum.

More than that, in every relaxation, the head is a little raised up (v. fig. 878 and 879).

The course to be followed in the Presence of a Relaxation

- a) If there is a **relaxation of the 3rd. degree**, do not hesitate; a new reduction under chloroform, is always necessary.
 b) If it is a relaxation of the **first or second degree**, the



Fig. 877. — Anterior relaxation. — 3rd degree: the support is worse here than in fig. 875, being given the exaggerated degree of rotation (external) which becomes more and more accentuated.

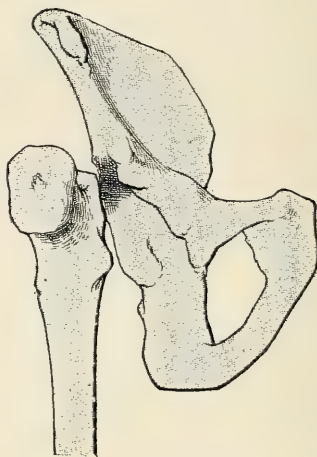


Fig. 878. — Another type of grave anterior relaxation. The osseous support is almost nothing, it is a hip nearly in the form of a flail.

course **differs** according to whether relaxation is **recent** or of **old standing**.

1st CASE. — *The relaxation is recent* (a few weeks).

One will make use of the mild measures indicated in p. 760. In luxations of the first degree, one employs them only at night. For the second degree, one employs them day and night, for three or four months. This treatment, if it be well carried out, will nearly always effect a cure. If it fail, have recourse to a fresh reduction.

2nd CASE. — *The relaxation is already of old standing* (6, 9 or 12 months, and more).

Let us say at once that **the first degree** (very often), and **the**

second degree (sometimes), **are compatible with very correct walking.**

If then you see that the **lameness is insignificant**, and that it is **diminishing**, you will **confine yourself**, for all treat-

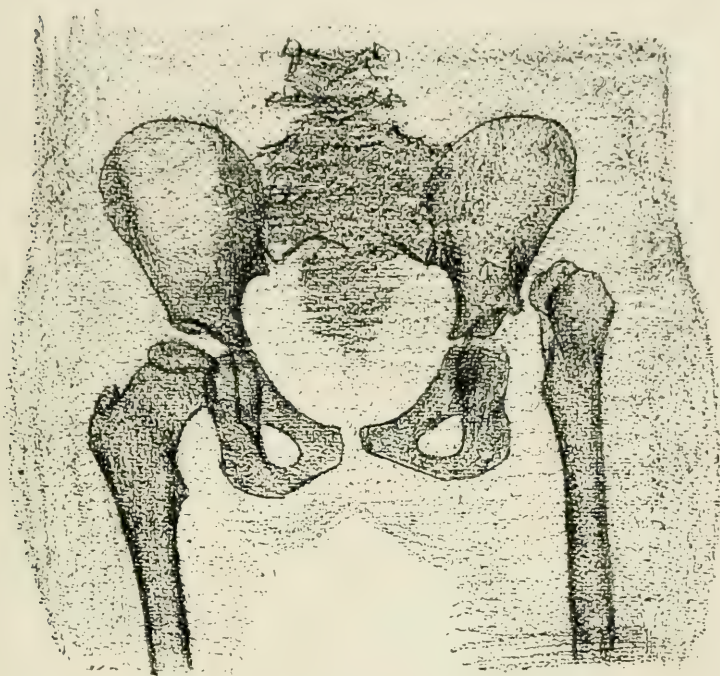


Fig. 879. — The deformity consecutive to the first treatment is here very marked; the great trochanter is situated manifestly higher than the head, hence an accentuated degree of coxa vara which will render the treatment of this relaxation difficult.

ment. to making at night, a firm internal rotation, in the manner described in p. 763. By day, the child continues to walk.

If it is a question, in the contrary, of a relaxation bringing with it a **very appreciable lameness, which does not diminish**, you ought to submit it to a **new treatment** (*new reduction and new plaster*).

For one does not succeed, in luxations already of long stand-

ing, in bringing the head forwards by simply employing bandages. The head refuses to leave the place it is in, being retained on the outside and above by powerful ligamentous adhesions.

You must of necessity, in order to allow the head to return to its normal place, soften and stretch the ligaments previously (it is especially the posterior part of the capsule which is shortened and retracted), — and the result will only be obtained by manœuvres made under chloroform.

The Treatment of an Anterior Relaxation

The technique differs according as one is treating a relaxation of the first or second degree, or a relaxation of the third degree.

A. — Relaxation of the First or Second Degree.

In the first case, the manœuvres are similar to those described for the first treatment — similar, but not identical. These are the differences.

Whilst for the first reduction, it is sufficient to carry the femur into a flexion of 90° , it will be necessary here to push such flexion up to 120° , 130° and sometimes more, to the point where the bent knee will become lodged in the axillary region.

The examination of the figures opposite (fig. 880 to 885) will show you the necessity of reaching this paradoxical position, if you wish to return the head of the femur to the acetabulum.

But, in order that the head of the femur may allow itself to be brought into this extreme flexion, it is evidently necessary that the joint should not have been stiffened by the first treatment, or at least that it has had time to recover its suppleness. If not, in wishing to “force” the flexion, one would surely cause a fracture.

This shows that it will be necessary to retard the reduction so long as the joint remains stiffened, and that it will be necessary to give it time to be loosened.

Do you wish to know at what moment the reduction may be attempted, without the risk of fracture? Examine the degree of movement in the joint. Try, with or without chloroform,

to flex the thigh, by proceeding with method and very gently.

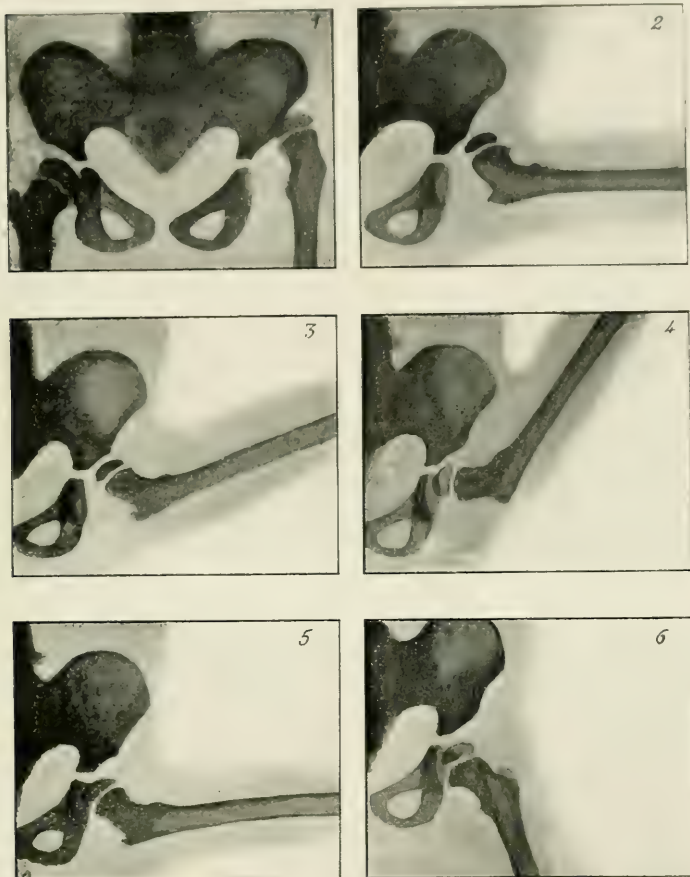


Fig. 880 to 885. — 1. Reluxation. — 2. If one confines oneself to placing the femur in flexion and abduction at a right angle, the reduction is not obtained. — 3. In order to obtain it here, one is obliged to **force the flexion** of the femur. — 4. It is necessary even to raise the knee towards the axilla, to perfect the reduction; this is the first position, here (see fig. 886). — 5. The second position. — 6. The third position.

If you are able to arrive easily at a right angle, the patient is ready for reduction.

On the other hand, if, in your attempts at mobilising, you

are arrested almost immediately by the resistance of the peri-articular tissues, do not persevere, postpone the reduction for one or two months.

In the meantime, bathe and massage the child, and leave him entirely free of all restraint, keeping him, however, on his frame, if he is not allowed to stand; while, if he already walks, you will allow him to continue his walking exercises.

When, two months later, you make a fresh examination, you will find, this time, that the hip has recovered its normal suppleness (or nearly so).

The patient is ready for the reduction.

The Reduction of a Relaxation of the 1st. or 2nd. Degree

It will be done under chloroform.

One commences by a brassage of all the peri-articular muscles and by rupture of the adductors; brassage and rupture which will be performed in the way described on p. 725.

Then one carries the femur into a flexion of 90°, and, from there, outwards, gradually to 30°, 40°, 50°, 60° of abduction.

When you reach 70°, or 80°, or 85°, suddenly there is a slight noise, a shock, and the reduction is done.

Up to that time, there is no difference between this and reduction in the first treatment.

But, when one is dealing with a relapse, very often no sound is produced with 90° of flexion. Then, push the flexion still further, by slowly carrying the knee towards the axilla, also increasing slightly the abduction: the sound will not be produced always, however. There remain cases where the characteristic sound and bound will not be perceptible at any time (whatever be the degree of flexion and abduction which you bring to bear on the thigh).

Do not be too impressed with this. The cure will be obtained even then, and the opening up of the acetabulum also, provided that you immobilise the thigh in the axillary position (of flexion at 130° or 140°, and abduction at 90° or 100°).

And in the other cases as well, in those in which such

sound is produced, you will give this same position to the thigh for the application of the plaster (fig. 886).

The treatment, one must admit, must be very carefully conducted.



Fig. 886. — The 1st position after the reduction of a relaxation. The knee is again carried towards the axilla (axillary position).

If you have a radiographic installation, verify at each step where you are; it is the only means of proceeding safely (v. fig. 880 to 885).

At each step of the treatment, you will take a fresh radiograph, either at once (before applying the plaster), or the next day or the day after that, through an opening made in the plaster apparatus — an opening which you can immediately close up again with a simple plastered bandage.

The steps of the treatment are three in number, and not two only, as in the first treatment.

The After Treatment.

It would be imprudent to wish *a return* all at once from the axillary position of the first plaster to the second and last position of the first treatment. One would risk thus the undoing of the reduction.

It is always wise, and it is even very often indispensable, to adopt an intermediary phase, that is, to make 3 plasters and 3 positions (altogether), in place of 2 plasters and 2 positions, as in the first treatment.

Accordingly, two and a half months after the reduction, a second apparatus in a flexion brought back to between 80° and 90° (see fig. 884-885), in an abduction slightly diminished (reduced to about 70°).

You see that this second position is nearly the first position of the first treatment.

Then, two and a half months afterwards, a third and last plaster, which corresponds to the second and last position of the first treatment.

Thus the entire treatment of a relapse lasts two and a half months more than the treatment of a luxation which has not yet been treated.

The Results.

They are very satisfactory. Nevertheless, one is not able to promise, when one is dealing with a relapse, functional results as perfect as when one is dealing with a luxation not yet treated. We are in the habit of saying that a luxation, unsuccessful at the first treatment, is a hundred times more difficult to cure, and **to cure well**, than a luxation which has previously had no treatment.

And I believe that such a second attempt at a cure should always be left to experienced specialists.

If this be true for a relaxation of the first two degrees, it is still more so for a relaxation of the third degree of which we are now going to study the treatment.

B. — Relaxation of the 3rd degree.

Here, you foresee from the lesions which characterise the third degree, that the reduction will not be made by manœuvres comparable to those of the first treatment.

For, that which dominates in the third degree, is the rotation outwards of the head of the femur (fig. 86²); and that which increases still more the difficulty of reduction, is the notable



Fig. 887. — Correction of a relaxation of the 3rd degree. — The pelvis is immobilised by an assistant; a second assistant grasping the thigh a little above the knee, imparts to the femur slight movements of internal rotation, placing it in slight flexion and abduction. But it is the surgeon who ought especially to perform the internal rotation by applying all his strength, with his thumbs placed behind the trochanter, and his index finger over the head of the femur.

aggravation, under the influence of the first treatment, of a primitive anteversion of the head and neck.

What will be necessary for us to do in order to return the head to its place?

It is necessary, **above everything**, to make the femur describe a movement of **internal rotation**. The result is obtained by a long sitting of gentle and gradual mobilisation of the thigh, made in the direction of this internal rotation (fig. 887) and in the course of which one will have to take care not to forget for a single minute that the vicious position of the femur is maintained by a **very strong posterior ligament**, produced and repre-

sented by the contraction and hardening of the posterior capsule.

One will **not** attempt then, to bring the femur inwards **violently**, one would only succeed in breaking the bone ¹.

This is the technique (fig. 887).

Reduction in Relaxations of the 3rd. Degree.

One assistant immobilises the pelvis. A second assistant seizes the affected limb; with one hand he supports the foot, with the other he embraces the knee, or better, the **middle of the thigh**. Because, when wishing to turn the knee round in the course of the manœuvres of correction, he will run the risk of causing a fracture of the femur above the condyle.

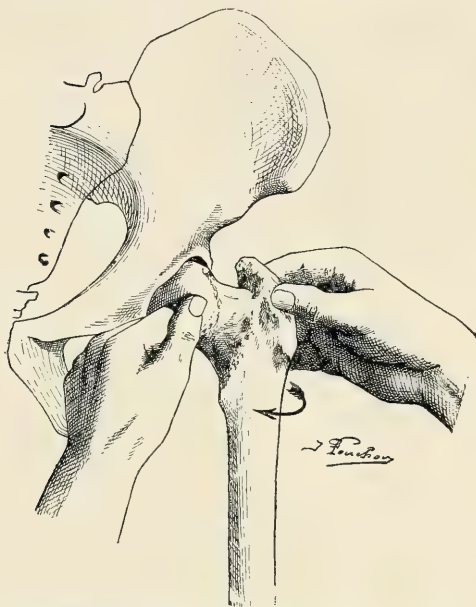


Fig. 888. — Correction of anterior relaxation. — How one acts upon the superior epiphysis; on one part, one draws the trochanter forwards, on the other part, one acts upon the head to force it backwards into the cavity. In a general way, the head does not re-enter in this way, during extension of the thigh, but in flexion (v. fig. 662).

You yourself embrace with both hands (fig. 887) the **upper third of the thigh** and, alone or with another assistant supporting your hands, you commence slight movements of **internal rotation**, of scarcely a few degrees, to-and-fro in a somewhat rhythmic fashion. At the beginning, for a period of 5, 10 15 minutes, and even more in rather old cases, you feel an invincible resistance, and you

1. If fracture occur, you will stop immediately; plaster, and repeat the correction 3 or 4 months later.

appear to make no headway. Do not be impatient, do not be discouraged, do not go too quickly nor too roughly, you might fracture the femur. After 5, 10, 15 minutes you will finish, at a given moment (a little sooner, a little later, but always) by feeling, or even seeing, that it "gives" a little, that it has already given a few degrees. A few degrees! How far it is from the end, seeing that one had to do nothing less than travel through 90° before arriving at the acetabulum, when the head was anterior; and through double, nearly 180° , in the extreme cases, where the head is looking directly outwards.

However, the greatest difficulty is overcome. From the moment you have elicited movement, you will gain ground rapidly.

This means that in half or **three quarters of an hour** (I have sometimes been obliged to go to an hour and a quarter) you will be able to accomplish the internal rotation necessary to carry the head opposite the acetabulum, but still a little above it.

You see then clearly, that in order to reduce into the cavity the head which is found **above it**, you must of sheer necessity carry it downwards, which you would be able to do only with great difficulty, if you left the thigh in extension, but which you will be able to do easily, by flexion.

Therefore, having carried the thigh into the very strong internal rotation necessary, you will **flex it** up to nearly 90°

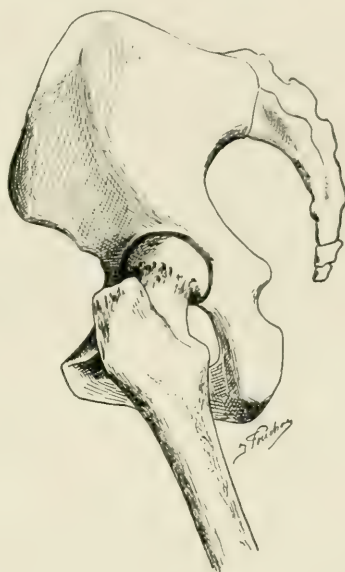


Fig. 889. — Hyper-correction obtained in a left anterior relaxation. — The trochanter, which was posterior, is moved forwards (on to a plane anterior to that of the head). But it is very rarely that one is able to reduce an extension in this way, solely by internal rotation. A hyper-correction too exaggerated may, strictly speaking, show a relaxation which would be made this time backwards.

(v. fig. 890), until you succeed by the combination of internal rotation and flexion, in making the head enter the acetabulum.

It does not enter by the posterior margin, as in the first reduction, but by the superior margin.

This last mentioned margin is the least marked; consequently, the jerk produced by the re-entry of the head into its former resting place is not always appreciable. It produces, however, nearly always, a slight click; and, if that is absent, your thumbs will always perceive, with a small amount of attention, a sen-



Fig. 890. — Correction of anterior relaxation. — Position generally given in the 1" plaster (after correction). — Flexion, abduction, internal rotation.

sation as of a piano key which goes and comes, is pushed down and released under the pressure of the finger.

To sum up, reduction is effected in **forced internal rotation associated with a notable flexion** of the thigh (adding to that the energetic pressure of two thumbs pushing from before backwards on the head of the femur) (fig. 888). One presses, flexes, and turns inwards until the head has disappeared in great part into the depth of the tissues, or until it has reached a point where it is felt a little backwards, against the posterior margin of the acetabulum.

However, the head should not make a too distinct projection at this last point, because one might go beyond the objective and bring about, in the long run, a posterior relaxation, by being too anxious to destroy the existing anterior luxation.

We may say, as a criterion, that the head ought not to overlap more than a few millimetres behind (fig. 889).

After having given to the head the position we have said, one makes **abduction**; an abduction as great as possible, without the head ceasing to be in contact with the acetabulum.

But, in order that the contact continues, one must not generally push the abduction to more than 30° , 40° or 50° .

In short, the femur will be fixed, in the generality of cases, in a position of **flexion** (fig. 890) of about 60° to 80° ; in an extraordinary **internal rotation** of more than 100° (fig. 891), if the head were primitively "external"; this rotation attains sometimes **nearly 180° for the heel**, which actually looks forwards, and finally in an **abduction** of about 45° .

The fixation in the plaster takes about two months—after which one verifies the position. One preserves the internal rotation, but one diminishes the flexion by two-thirds or three-quarters, provided that the head (in spite of this diminution) remains still enclosed, which

one would know by palpation of the hip, that is, that one preserves the minimum flexion compatible with this enclosure, and that one applies a second plaster to maintain the position thus deflected (more or less). The new plaster will remain in place like the first, for about two months (fig. 892).

At the end of that time (six months in all), one allows the child to walk without the apparatus. At night, one keeps it



Fig. 891. — Anterior relaxation : for correction, one is often obliged to make internal rotation of the knee of more than 90 degrees.

still in internal rotation by means of ordinary soft bandages (see p. 750 and after).

The thigh, after removal of the plaster, returns gradually to its normal position; it does so, however, without the head leav-



Fig. 892. — 2nd position and 2nd plaster. — The flexion in the first position (fig. 662) has disappeared here and one maintains the new position for 3 months longer.

ing the acetabulum, which is a fact observed many and many a time by us, but which is not comprehensible save by admitting that the angle of the neck and the anteversion have been modified under the influence of the new position of the thigh and of new mechanical and static influences undergone by the femur since its second reduction.



Fig. 893. — A. D. . 5 years, right luxation. — Before any treatment.

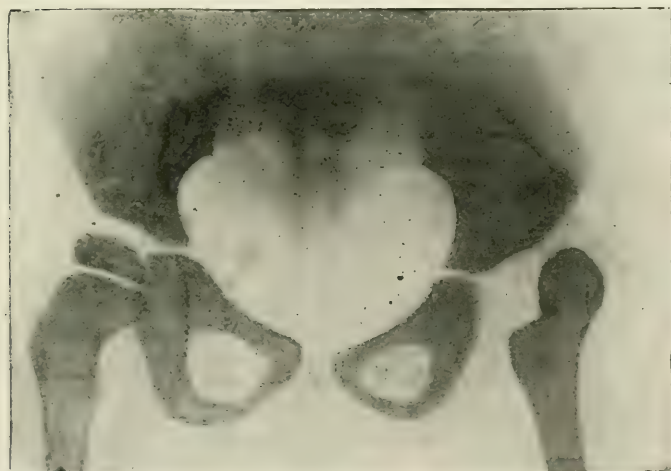


Fig. 894. The same child, who had already been treated for eight months by another surgeon. — Anterior relaxation of the 3rd degree.

I must tell you that you need not be too concerned *a priori* at the torsion of the femur; it untwists itself, it alters its direction, it turns in the direction desired, in the most favourable direction for standing and walking, when one has secured a good reduction of the head into the acetabulum—just as the

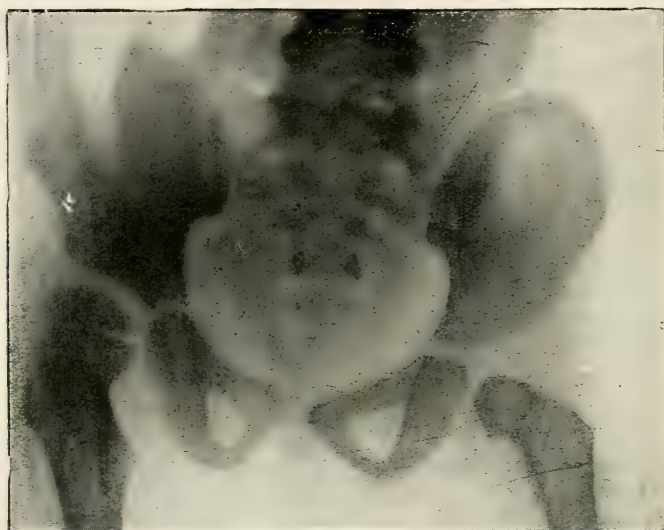


Fig. 895. — The same child. Relaxation corrected with manœuvres of internal rotation of more than 90 degrees, with 50 degrees of flexion and abduction of 40 degrees.

deformity of the femur increased, by the sole fact of the relaxation of the head.

One moderates or one encourages, by preserving the reduction at night, this spontaneous return of the thigh to its normal position, according as the head appears to have already sufficiently made a place for itself in the acetabulum or not; generally, the limb finishes, after about ten months, by finding its normal position again, without the head having abandoned the acetabulum.

Sometimes, however, the head leaves the acetabulum slightly, but not sufficiently to cause a defect in walking. Instead of an anterior luxation of the third degree we have only a relaxation

of the first degree, which, as we have seen on p. 786, is nearly always compatible with very correct walking.

Sometimes a slight **genu valgum** persists. One treats it by the ordinary measures indicated on p. 609 for the treatment of genu valgum.

And, finally, after a year and a half or two years, one arrives, by means of these corrections of luxations, at some excellent results (v. fig. 893, 894, 895), at the entire or almost entire disappearance of the lameness left by the first defective treatment.

B. — POSTERIOR RELAXATION.

Diagnosis.

In default of the X rays one makes the diagnosis by the following signs: apart from the walking, which is the same as before reduction, one finds as well, by examination of the leg, the clinical signs of luxation: shortening of the leg, generally adduction and external rotation of the knee, noticeable prominence externally of the great trochanter which, more than that, is mounted above Nelaton's line. — the possibility of feeling the **head in the buttock and the sensation of a void** opposite the artery.

With these facts, the diagnosis is very easy.

It is necessary **always to treat posterior relaxation** because it is always incompatible with regular walking.

Treatment.

This consists in making a new reduction — by manœuvres analogous to those performed in the first reduction. Note, however, some differences.

a. Reduction is, this time, much more easy, and there is no necessity for anaesthesia, in ordinary cases, when the relaxation dates less than three months.

The pelvis being fixed by an assistant, you yourself take the thigh and flex it to 90°, then you carry it outwards gradually, with both hands (or even with one hand only, the other being



Fig. 896. — Double congenital luxation.

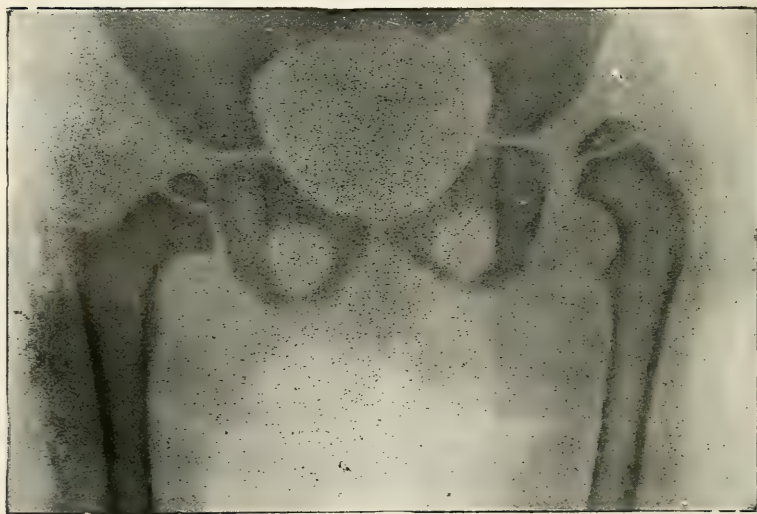


Fig. 897. — The same, four months afterwards. — The double luxation is reduced.

used in **forcing the head from below upwards**, in order to replace it in the acetabulum).

At a given moment, you feel that the abduction gains a good deal, and that the knee sinks suddenly; the head has moved inwards and upwards; that is the re-entry.

b. One does not generally detect any click at the moment



Fig. 898. — The same. — Posterior relaxation of one side, three months later; the child limps again on the left side; the radiograph shews that the head of the left femur has left the acetabulum.

of the reduction. As the relapse has been produced by the wearing away and obliteration of the posterior margin, one easily understands why one does not obtain any click as the head passes the margin which is so very blunted; there is only a slight **dull sound**, a little **rubbing**, often scarcely perceptible.

Whether a noise exists or not, one can always easily discover, by **palpation** of the groin, that the head has moved from behind forwards, and that the reduction is made.

c. In order to repair the posterior margin, if much worn,

and in order to brace up the posterior capsule which is too loose, one keeps up the **abduction** this time not only at 70° , but **at 90°** (after a forcible flexion of the thigh at 120° ; that is, the knee raised up towards the axilla.)

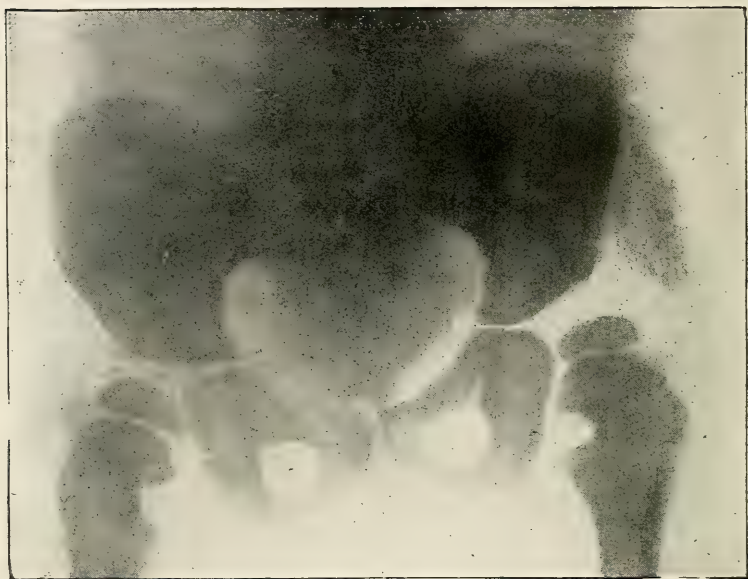


Fig. 899. — The same. — Reduction of the relaxation and its maintenance in a plaster (90 degrees of flexion, 90 degrees of abduction, 0 degrees of rotation). Three months afterwards, a new plaster in the second position.

Radiograph taken one year after the correction of the relaxation. This time, both sides remain well reduced.

d. The means of retention may be the same as that indicated on p. 767, for overcoming the tendency to relaxation (p. 856), namely, some turns of Velpeau bandage, and fixation to the mattress.

You are able then to omit the plaster in order to maintain the correction, in the case where a return to plaster is objected to by the parents, but I do not advise you, however, to do this for any but private cases, who have friends about them and are

well looked after; in the hospital, on the contrary, you will make use of a plaster, which is by far the simplest method.

After two and a half months, you pass to the second position for two or three months. The rest of the treatment is as given p. 760.

The results obtained are perfect (v. fig. 896 to 899).

Success is here more perfect and more easy to attain, as a general rule, than in **reluxation forwards**, especially of the **third degree**. So that, considering all things, an anterior reluxation is **much more troublesome than a distinct posterior relapse**.



Fig. 900. -- Luxation of the anterior variety.

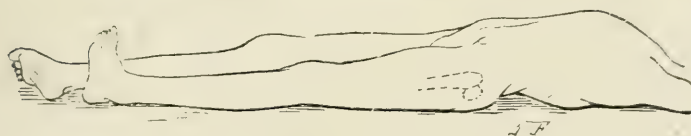


Fig. 901. — Luxation of the posterior variety with marked coxa vara.

IRREDUCIBLE CONGENITAL LUXATIONS

Limits of reducibility. — Contra-indications to an attempt at reduction.

At what age is reduction impossible? That varies very much **according to the case** (the degree of shortening in the anterior or posterior variety of luxation, fig. 900, 901, 902) and, perhaps, far more, **according to the operator**. The reduction of simple congenital luxations has been possible up to 15 or 18 years, and even beyond that, by us and by several specialists. For you, who are not specialists, I think you ought to consider

the extreme limit as 6 or 7 years for unilateral luxations, and from four and a half to five years for double luxations.

There are then, age limits upwards for the treatment of luxation, whilst *there are none in the opposite direction*; on my own account, I have performed reduction in infants of 8 to 10 months, and even of 3 to 5 months (the luxation having been possible of detection, before the patients had walked) and the cure has been perfect.

The Course to be Followed in Irreducible Luxations.

What is to be done in the presence of a luxation which you

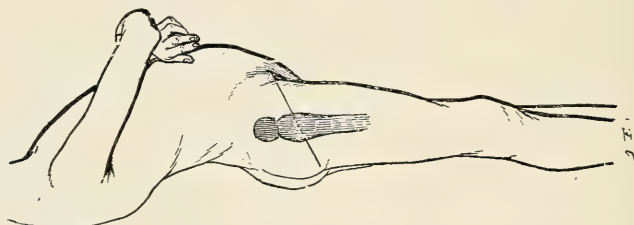


Fig. 902. — Intermediary luxation, directly supra-cotyloid.

have been unable to reduce, — in spite of two attempts under chloroform made at an interval of a few weeks and persisting after continuous extension of several months.

In such a case, I advise you, as a general rule, to do nothing, if there is no **palliative** treatment for the embarrassing symptoms produced by the luxation (v. p. 812).

But that is not to say that an experienced specialist may not succeed, in reducing these obstinate luxations.

One may succeed, in fact, by means of **surgical operation**. There are *three operations* which will effect the reduction.

1st. Hoffa's Operation : one clears out with a curette the site of the rudimentary acetabulum, creating a cavity capable of receiving the head of the femur.

But, *a.* — The operation is *severe*, it exposes one to septic accidents.

b. It causes lesions of the Y cartilage and consequently, *troubles of development* in the iliac bone.

c. It brings about *ankyloses*, as a consequence of the damage done to the bone and the soft parts, which are largely torn open.

2nd. **Senger's Operation**, which is an extensive arthro-

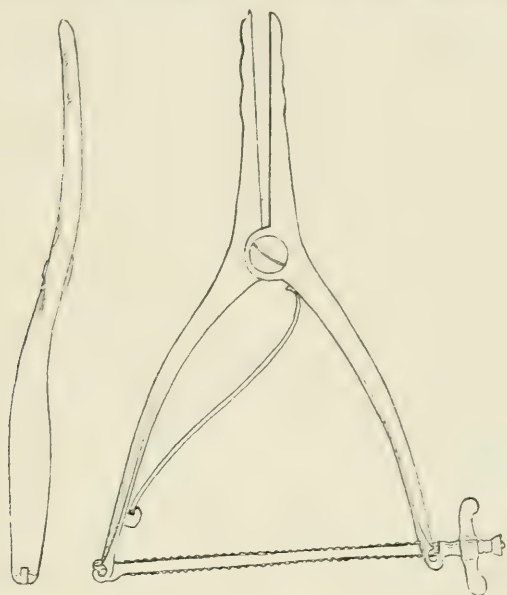


Fig. 903. — Dilating forceps which I have had made. They are extremely firm (with a force of 100 kilog.) and afford an enormous dilation, greater indeed than is necessary.

tomy, but does not clear out the acetabulum, and merely replaces the head of the femur against the rudimentary acetabulum.

But : *a.* This operation, although less formidable than that of Hoffa, *remains serious*, however, for the same reasons.

b. It produces *reductions* which are *very unstable*, because the capsular canal being torn open does not fix the head against the acetabulum.

c. The extensive tearing of the capsule and of the soft tissues leave hard adhesions and fibrous *ankyloses*.

For these various reasons these two operations are practically abandoned.

3rd. **Our operation**, or *reduction after sub-cutaneous stretching of the capsule of the femur*.

Our operation escapes the reproaches to which the preceding two operations are open.

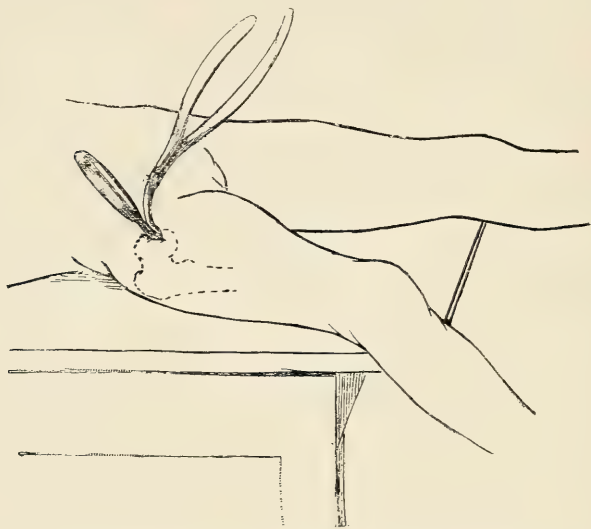


Fig. 904. — 1st. step. — The incision is made; the points of the dilator are introduced into the capsule; one makes them slide on the flat of the bistoury left in position to serve as a guide (hyper-extension and external rotation of the thigh).

a. There is *nothing serious*, because the cutaneous incision measures scarcely two or three centimetres, and one has no need to insert the finger in the wound (therefore no risk of septic accidents).

b. Preservation of the anterior capsule, which is very valuable for facilitating the reduction and *ensuring its maintenance*.

c. *No more hard cicatrices* than in a sub-cutaneous tenotomy or osteotomy; therefore the *functional results* will be obviously *as good* as in the bloodless method.

To establish its legitimacy, we say, first, that when irreducibility exists, in spite of continuous extension made for many months and forcible extemporary extension, it is due to an insuperable **constriction** of the **capsular canal**. It will be sufficient then to make a sub cutaneous dilatation of the canal.

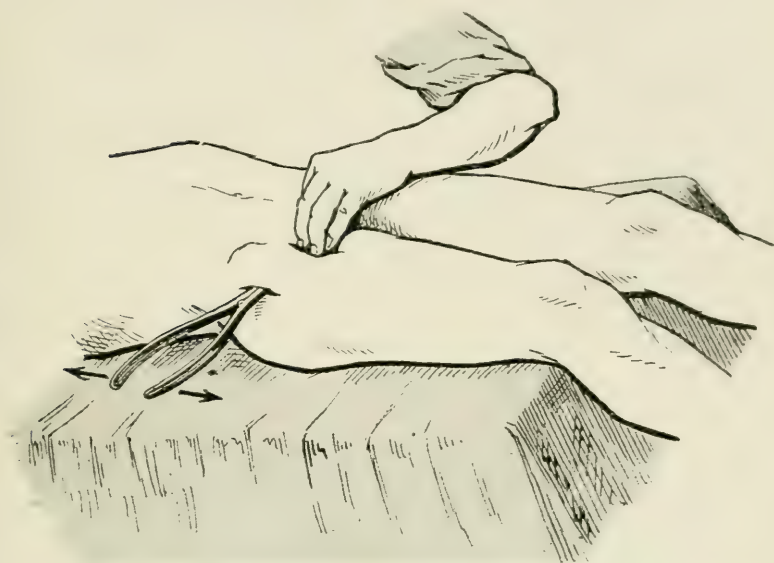


Fig. 905. — 2nd. step. — The fingers of an assistant fix the tip of the dilator (through the soft tissues) during the dilatation of the capsular canal.

We use, for that, a **special dilator** of extremely strong construction, made for this purpose (fig. 903 to 907).

Operation.

1st. A cutaneous incision (from 2 to 3 cm.) is made opposite the anterior part of the head, which is *easily palpable* (if the thigh is in hyper-extension) at the external extremity of the capsular canal.

2nd. One opens this by a button-hole of a centimetre and a half.

3rd. One introduces the dilator from without inwards down



Fig. 906. — Congenital luxation irreducible by the ordinary manœuvres.



Fig. 907. — The same, reduced by our operation (sub-cutaneous dilatation of the capsule of the femur).

to the bottom of the acetabulum; one feels its blunt extremity beneath the artery (fig. 904).

4th. Then one opens the instrument to dilate the constricted capsule; one does this gradually and methodically until one has obtained a dilatation proportionate to the volume of the head, which has previously been determined.

5th. The capsular dilatation being effected, one withdraws the instrument, one places a tampon over the wound, one makes the reduction by the ordinary manœuvres described above (v. p. 728).

And one carries out the **after treatment** just as in the orthopœdic method.

We refer you, for details of the operation, to our large treatise on *Congenital Luxation* (Masson).

We have performed this operation in twelve cases, in subjects of from eleven to eighteen years of age, and in all the cases which had remained irreducible by orthopœdic methods, we have been able, after dilatation of the canal of the capsule, to obtain reduction of the head of the femur.

Indications for and contra-indications against our operation. — It is indicated in all unilateral luxations hitherto irreducible by the orthopœdic method, because, in **unilateral** luxations, **reduction** has **always** many **more advantages** than **inconveniences**.

The possible inconvenience, in older children, is the remaining of a certain stiffness of the hip, such as results from the orthopœdic method. For, if the stiffness resulting from our operation is not appreciably greater than that left by the orthopœdic reduction, it is evidently not less.

But, for unilateral luxations, the inconvenience of the relative stiffness (existing on one side only) is as nothing compared with the great advantages which reduction brings with it.

On the other hand, in cases of **bilateral** luxations, if considerable stiffness persists on both sides, the operation will not have brought sufficient amelioration, from the point of view of

walking, to compensate for the tediousness of the long treatment.

But, for children of more than ten years, a noticeable stiffness will **generally persist**, whatever is the method employed, whether the method be the orthopædic, or our operation.

After 10 or 12 years of age, the articulations are already slightly impaired.

We will conclude by saying :

For unilateral luxations, the contra-indication to any active treatment depends entirely upon the impossibility of reduction.

For double luxations the contra-indication depends not only upon this impossibility, but also upon the age of the child. After ten or eleven years, in double luxations, there is not, unless from special indications¹, any certain advantage to be gained from either a surgical or an orthopædic reduction and one will then depend upon a palliative treatment

These are the rules even for specialists.

PALLIATIVE TREATMENT OF IRREDUCIBLE LUXATIONS

If the parents are not willing to hear, at any price, of an attempt at a real reduction, it will be necessary for you to resign yourself to undertaking only a simple palliative treatment, in order to obtain some functional improvement.

In short, the function may be disturbed : 1st by too great liberty and *excessive mobility* of the head of the femur (the head oscillating, moving to-and-fro extensively, with each step); 2nd by *deviation of the knee* : *a.* deviation *inwards*; the knees knocking together at each step, if it be a double luxation; *b.* *flexion* of the knee, whence shortening, hollowing, etc., less good support of the femoral head which is carried so much the more backwards into the buttock.

To correct flexion and abduction one uses means gentle and

1. Thus, in some children of more than 12 years of age who presented **very great laxity**, almost abnormal, of **all the articulations**, we have reduced double luxations and obtained a very manifest improvement in walking as to endurance as well as to regularity).

slow, or even brusque and rapid, just as when one is correcting a club foot or a coxitis.

The **choice** to be made amongst these different methods

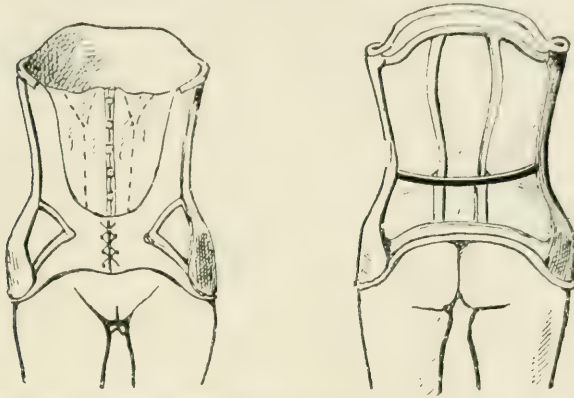


Fig. 908 and 909. — Corset designed by Breant to prevent swinging of the hips and to ensure steadiness of the femoral heads by pressure over the trochanters.

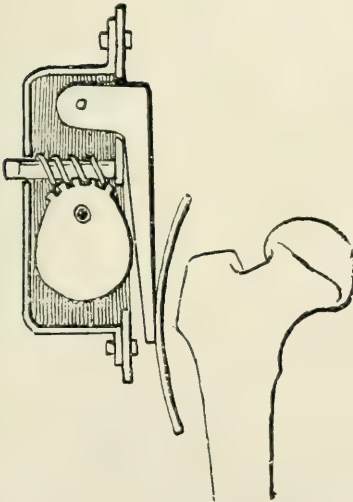


Fig. 910 and 911. — In this apparatus an excentric (regulated by a tangent screw) presses upon the trochanter.

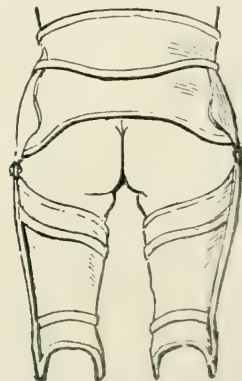


Fig. 912. — Double apparatus with this appliance.

depends rather **on you**, according as you are able or not to attend to the child every day yourself.

It depends **on the friends**, who sometimes allow, and sometimes refuse you, an entire initiative and the free choice of the method.

Many families agree only to **mild** measures; therefore, no anæsthesia, no pain, no shocks, even if the result is to be much more distant and even more incomplete.

Well! you know that you can succeed, by mild measures, in arriving at a satisfactory result. One can correct or lessen a deviation by a procedure analogous to that of the slow and gentle redressment of a coxitis.

There are three methods of improving the situation.

1st method. — **Orthopædic Appliances.**

a. *To lessen the vertical oscillation*, and the to-and-fro movement of the head, one invents a check, an artificial ceiling to the trochanter.

This is the rôle of corsets or girdles having a gusset with an inferior concavity moulded to the prominence of the trochanter, supporting and arresting it slightly in walking.

These orthopædic girdles, in celluloid or leather, of which the patterns are so numerous (every maker has his own) effectively lessen a little the lameness and fatigue in walking. Corsets and girdles are made on a **mould** taking in the shape of the pelvis and the projection of the trochanter (v. fig. 908 to 909).

b. *If it is a question of lessening flexion and adduction*, one has made a large apparatus similar to that in fig. 74, p. 89, an apparatus articulated at the hip, capable of affording each day a little more abduction and extension.

This first method is much less practicable and effective than would appear at first sight, the apparatus being either inadequate, or too likely to be thrown out of order.

Second method.

Without real operation or anæsthesia. Successive plasters [to correct flexion and abduction] (see fig. 913 to 918).



Fig. 913. — Double luxation. Lumbar concavity, flexion of the hips and flexion of the knees. The arrows indicate the direction of the correction to be made.



Fig. 914. — One sees here the abduction of the femur. The arrows indicate the direction to exert the pressure and traction in order to obtain a relative correction.

The child does not discontinue walking. It is, in a way, a mixed method.

This is what it consists in : you make a correction of 15 or 20 minutes duration every two or three weeks, proceeding gently and gradually, massaging, kneading, lengthening the ten-

dons and muscles, as far as the limit tolerated by the child.

You carry the femur successively outwards, then backwards, and, after a quarter of an hour or twenty minutes of manipulation, when you have gained 10° or 15° for instance, you fix the result with a plaster apparatus reaching from the umbilicus to the knee.

Whilst the plaster dries (before it sets definitively), try once

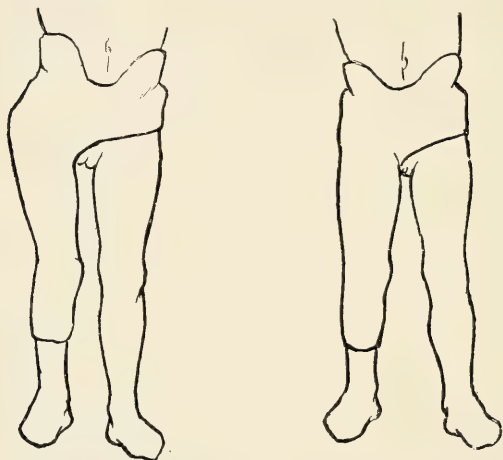


Fig. 915. — First step of the correction.

Fig. 916. — Second step.

more to gain 2, 3, 4, 10° . — That will be enough for two or three weeks.

At the following sitting, the plaster being removed, you recommence, with the help of the same manipulations, the softening and stretching of the abductors and flexors, where you gain anew; then a fresh plaster, and so on.

This is a method of proceeding which is generally very well received by the parents and by the children, and which will be practical for you. If it has been well applied, it will always produce an apprecial improvement. — One preserves it by an after-treatment of massage, active and passive exercises.

Third method.

Immediate correction at one sitting, **under chloroform**.
Then a plaster apparatus.

Indeed, you know that, when you have *carte blanche*, you may arrive at once, not only at correction, but at hyper-correc-



Fig. 917. — Third stage.

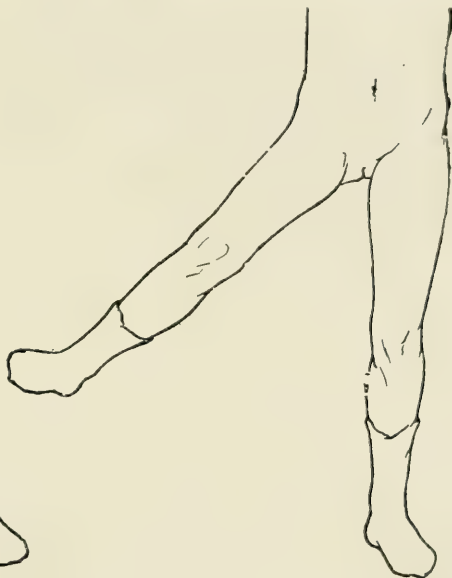


Fig. 918. — On removing the plaster, one has abduction and hyper-extension. Allow the normal position to return gradually.

tion, with the help of anaesthesia, by vigorous manœuvres on the shortened muscles. In short, you will make the kneading of the abductors and flexors described on p. 725, a kneading which generally suffices, without having to resort to sub-cutaneous rupture or to tenotomy except in very exceptional cases. You will then push abduction up to 50° or 60°, hyper-extension to 25° or 30°, and make a rotation in the opposite direction to that which is present, sometimes internal, sometimes external.

The hyper-correction is maintained by an apparatus reaching from the umbilicus to below the knee (a medium plaster, fig. 917), with which the child will be able, if desired, either to rest, or walk, by wearing a high boot on the affected foot.

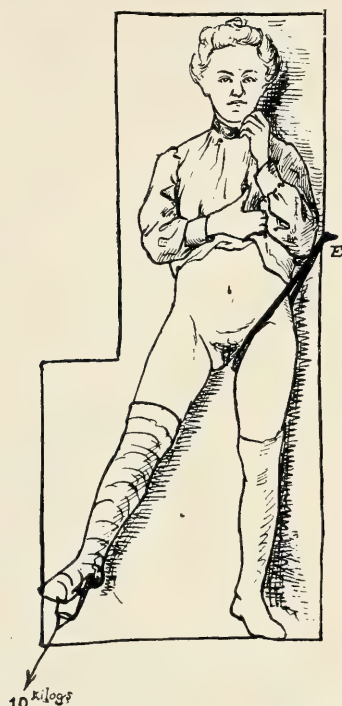


Fig. 919. — Method of correcting the tendency to abduction.

After two months, one puts on a second apparatus, for the same length of time, during which the abduction and hyper-extension are diminished by half; then one applies a third apparatus, this one removable, in celluloid or leather, in a position of slight correction : abduction of from 20° to 25° and hyper-extension of from 12° to 15° .

After which, the child is freed of all apparatus : one massages two or three times a day, one attends to the education and the walking, one causes to be made movements of abduction and hyper-extension, in order to leave always the adductors and flexors, formerly contracted, somewhat weakened, and thus prevent the return of the deviation.

By returning, at night, to **extension**, the leg being maintained in an abduction of 20° , by placing a **cushion** to raise the pelvis (see fig. 919), one preserves hyper-extension. After-treatment consists of active and passive exercises, and education in walking.

To sum up, you see that you are able to arrive at a result by this orthopædic method, either by gentle and slow means, or by means which are brusque and rapid.

You will never have occasion to perform the **Osteotomy** supra or sub trochanteric of Kirrison, which is, in spite of everything, **less simple** than the treatment we have indicated, and **less effective** also, for osteotomy leaves distinctly a shortening of the femur, which adds to the shortening which already exists; it does not certainly guarantee against the progress of the deviation, unless one treats also the tendons and the muscles in the manner mentioned above. But this direct action on the tissues is sufficient, without one needing to interfere with the skeleton.

You will never have occasion to perform the operation known as the pseudarthrosis of Hoffa (refreshing the head and the iliac bone opposite the head, without reduction). We dissuade you for similar reasons: it is a treatment of greater difficulty and of less efficacy, from the point of view of lengthening of the limb and correction of the deviation, than the treatment we have recommended above.

Therefore, in the case of irreducible luxation where the parents do not desire you, or rather, permit you only, to ameliorate a little the function and increase the endurance of the child in walking, and are opposed to a real reduction, have for your rule for correction of the existing deviation simply the treating of the adductors and flexors, carrying the head of the femur to the anterior part of the iliac fossa, in order to improve the support as much as possible.

It is then a treatment for which you can accept the responsibility, and which will give you a real improvement, if, at the same time that you correct the position, you attend to the education of the walking and the strengthening of the muscular system, by every means possible: frequent massage, active exercises, baths, electrification, etc.

CHAPTER XII

CONGENITAL CLUB FOOT

Diagnosis. — A congenital club foot is easy to recognise. It is a defective position of the foot which is *permanent* and exists **from birth**.

It is important to **distinguish it from paralytic club foot** : that is easy, even when it occurs in a child of 5, 10, 15 years :

a) *By the history.* — The paralysed foot appears at 1, 2 or 3 years, after an attack of infantile paralysis (see p. 668), whilst this exists from birth, although it may not be noticed, sometimes, until some weeks later.

b) *By the shape of the foot.* — This is nearly always equino-varus. The other (the paralytic) takes all kinds of shapes (fig. 920).



Fig. 920.

c) *By the resistance of congenital club-foot to redressment.* — It is redressed with great difficulty, even in small infants, the bones being already deformed; the paralysed foot is redressed, on the contrary, with facility, the bones remaining nearly always unaffected for a very long time.

d) *By examination of the entire limb.* — The muscles are hardly involved in congenital club foot, whilst in the other, the muscles and tissues of the entire limb bear the trace of infantile paralysis.

The **ordinary form** of congenital club foot, as we have said, is the **equino-varus**.

It's degree varies generally according to the age, and also accor-



A.

Fig. 921.

A. Equino-varus of 6 years treated by forcible redressment at one sitting of half an hour.

B.

Fig. 922.

B. The same, a year after, seen on the inner surface.

ding to the subject, for sometimes a club foot of one year's standing will be as advanced in development and as severe, as another club foot of four year's standing :

Chosen age for treatment.

At what age ought one to attend to it? **As soon as possible.** — Not, however, from the day of birth, as would Sayre, whose caprice you should know : “ I concede to the doctor ”, he says, “ the right to deliver the mother before attending to a club foot of the newly-born : but he will not leave the house before having put an apparatus on it ”. No, not that ; nevertheless, in private cases, in careful families, one will attend to it on the third, fourth or fifth week, that is when the infant is recognised as more viable.

TREATMENT OF CLUB FOOT

Club foot is always curable. — I am obliged to say this for the sake of certain practitioners who are still in doubt.



A.

Fig. 923.

A. Congenital equino-varus of 23 years standing treated by forcible redressment in two sittings of $3/4$ of an hour each.

B.

Fig. 924.

B. The same a year later; viewed on the external surface.

If any club foot has not been cured in spite of treatment, it is because the treatment has not been properly carried out.

Here, as in congenital luxation of the hip, the failure ought to be attributed not to the gravity of the malady, but to the practitioner, who has not carried out, or to the parents, who have not allowed to be done, that which was necessary for the cure.

And more than one way leads to success; there are three, three rival methods, by which it is possible to succeed.

1st. Daily manipulations (where one cures without chloroform, without bistoury, « without a scratch of the skin »)

by "mechanics" or supportive "boots", worn during the intervals of the sittings for manipulation.

2nd. **Surgical operation**, where one divides the contracted soft parts, and where one removes from the skeleton everything which prevents the foot being placed in the correct position. One does not hesitate even to remove some bone from the foot if it is necessary for the correction.

3rd. **Forcible redressment**, a mixed method which does not involve operation on the bones, but only anaesthesia, with, in a general way, division of the tendo Achillis.

One performs forced redressment of club foot just as one would orthopaedic redressment of a deviation of the hip or of the knee, when it is somewhat obstinate.

Do not believe that each of the three treatments is applicable only to club foot of a certain age, to the exclusion of the others: that, for example, manipulations are suitable exclusively for quite little children, and surgical operation for children of more than ten years of age.

No; whatever the age of the patient may be, the practitioner has the choice of his treatment. Manipulations are sufficient for patients of ten and fifteen years, and even for adults. On the other hand, osseous resections have been made with success in many children who have not yet walked (Jalaguier).

In the same way, forced redressment is, for many practitioners, the only treatment for club foot from three months of age up to adulecy, inclusively.

But understand well what I mean to say, that an expert specialist may be able to guarantee to arrive at a cure with any of the three methods; but for you, who are not specialists, who wish for the most practical treatment, I consider that the **1st and 2nd methods** are precisely **neither practical nor simple**.

The first, because it is **impossible** for a **practitioner** to see his patient two or three times, or even once, each day for a period of six to twelve months, in order to fashion and

manipulate the foot for a quarter of an hour each time, and to replace it exactly and minutely in its retention apparatus.

To depend upon the parents carrying out daily this necessary “shaping” treatment, and to shew you the child regularly, which would allow you to control, to verify, to rectify if need be, and to complete what has been done, is without doubt not



Fig. 925. — Manceuvres of correction in young children. The foot rests in the hollow of the left hand, the thumb outside, the other fingers hooked round the internal tuberosity of the os calcis. The right hand grasps the fore part of the foot in flexion imparting to it a twisting movement which lowers the internal border and raises the external border.

impossible theoretically, but it is generally not wise **except**, perhaps, in the case of **children of the upper classes**.

Here I advise you to make, **from the first days** after birth, massage, exercises to promote suppleness, and redressing movements, for 7 or 8 minutes, three times a day, followed each time by the application of our lever-boot (see fig. 926 to 929) in order to maintain the correction.

This treatment, well done and continued, will allow you to carry the foot, **after** a few weeks or **a few** months, into hyper-correction; you will then, to preserve this, apply a **small**

plaster made in the way which we will describe further on, and which will remain in position one or two months, after which you will replace it by a second, then by a third. When the foot has been **supported** in this way for **five or six months in hyper-correction**, the cure is, and remains, effected.

If hyper-correction has not been thus obtained, you will hold, in order to reach it, a sitting of forced redressment under chloroform, but I would not advise you to have recourse to chloroform before 8 or 10 months.

The second method is also **not acceptable to the generality of practitioners**, who will hesitate to have recourse to a surgical operation which ought, to be effective, to cut away the skeleton considerably. And, even if the practitioner does not hesitate, there are the parents who will refuse their consent to the operation "on the bones of the foot".

For all these reasons, **I would advise you** to have recourse, as I have myself, to the third method, that of **forcible redressment**, generally at one sitting, or at two or three, with a month's interval between the one and the other, in exceptionally obstinate cases.

The redressment at one sitting is performed **under chloroform** and lasts from 15 to 30 minutes, according to the age of the subject and the difficulty of the case. It can be done without any machine, without any instrument, **simply with the hand**, without bistoury if you like, and, at any rate, by

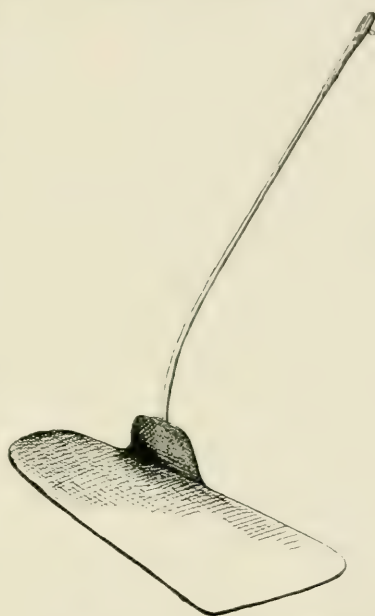


Fig. 926. — Our lever-boot. The stem is of soft malleable iron.

confining the use of the bistoury to a single sub-cutaneous division of the tendo Achillis, which is so easy and so harmless. It is a **very simple, very effective** treatment, and, thanks to it, **every practitioner**, without exception, may treat and cure all

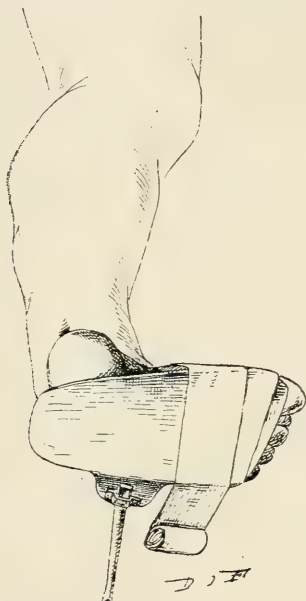


Fig. 927. — Application of the lever-boot. 1st. step : the plate is adjusted beneath the sole of the foot, the stem on the outside ; a few turns of bandage fixes firmly the fore-foot, the heel overlapping on the inner side.



Fig. 928. — 2nd. step : when the fore-foot is fixed, a cast of bandage serves to force the heel and place it over the plate (correction of the curvature of the internal border).

the club feet seen in ordinary practice, up to 12 or 15 years, and, strictly speaking, up to 18 or 20 years.

But the success depends upon the exact observation of the following capital recommendations :

1st. To be sure of reaching all the factors of the deviation. It is necessary for you to attack them one by one, “ **breaking them up** ”.

2nd. To effect not only the correction, but even **hyper-cor-**

rection. You must **obtain too much to retain sufficient.** In a general way, one makes the correction too short, too loose. Know that therein lies the secret and the cause of the relapses observed by some practitioners; they have not pushed their hyper-correction far enough.

3rd. One ought to apply a plaster which will support **exactly** and **without injury.**

It is necessary to proceed with method, as we have said, to attack all the factors of the deviation, to attack them one after another, to obtain the correction by breaking them up.

A. — Technique of Forcible Redressment.

It may appear at first sight that, in equino-varus, the foot should simply be carried inwards and downwards, and that it suffices, consequently, in order to redress it, to carry the toe outwards and upwards.

Well, no, that does not suffice. The pathological anatomy and physiology of club foot teaches us that the deviation is complex, that the point of the foot cannot be carried inwards¹ without it folding over the internal border, which thus becomes concave, and without, moreover, the internal border being raised, whilst the external border is lowered.

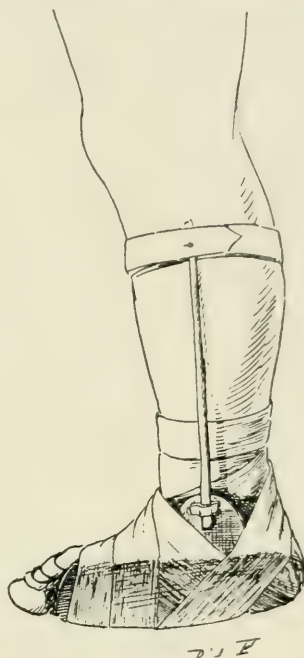


Fig. 929. — 3rd step: One ends by fixing the foot over the plate, then bringing the stem to the leg; by this movement the foot is carried entirely outwards, and its outer border is raised.

1. Similarly, in scoliosis, the vertebrae are unable to incline to one side without undergoing at the same time a twisting movement.

In the end, one finds the following factors.

1st. The fore part of the foot carried inwards in **adduction**.

2nd. The **internal border** of the foot changed into a **conca-**
vity looking upwards and of which the extremities are the great
toe and the internal part of the lower extremity of the os calcis,
whilst the external border is changed to a convexity with its apex

corresponding obviously to the
middle of the external border
of the foot, or to the external
part of the medio-tarsal arti-
culation.

3rd. An **equinism**, that
is, the heel well above the
point of the foot.

4th. A **hollow foot**, the
sole making a broken line,
with an upper angle opposite
the medio-tarsal joint, without
reckoning the inflexion of the
two halves external and inter-
nal, of the sole, folded the one
over the other in the same
way as the two sides of a
dihedral angle.

5th. A **supination** of the
foot, the external border low-
ered, the internal border raised.



Fig. 93o. — Inversion of the internal
border.

This appears complicated; nevertheless, the existence of
these different factors of the deviation is quite easy to under-
stand, with a little reflexion and a reference to a club foot.

Well! to be quite sure of entirely and definitely redressing
a club foot, you ought yourself methodically and successively
to attack these different factors.

This is how one proceeds, the intervention being carried
out, of course, under chloroform.

1°. **Adduction.** — The axis of the foot reaches, by its anterior extremity, inside the axis of the leg. Bring it outwards (fig. 933). This movement takes place a little in the tibio-

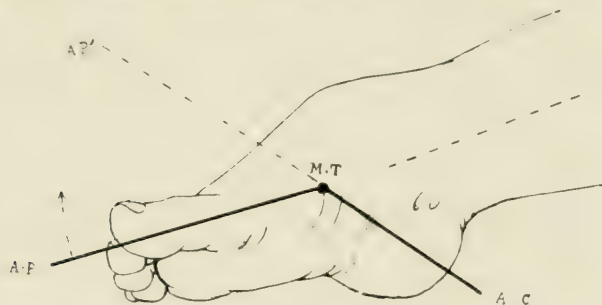


Fig. 931. — M. T. Medio-tarsal articulation.

M. T.-A. C. Axis of hind part of foot.

M. T.-A. P. Axis of the fore foot.

The arrow indicates the direction of the first step of the correction of equinism: by this manœuvre the axis of the fore foot becomes M. T.-A. P'.

tarsal, a little in the calcaneo-astragaloid joint, but especially in the medio-tarsal.

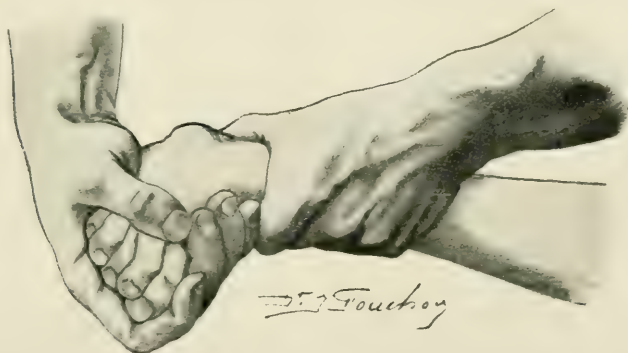


Fig. 932. — In children, one grasps in this manner the foot and the leg: the left hand supports the foot, the right hand effects the movements of correction.

a) Force back the foot *en masse* inwards and outwards, at the medio-tarsal articulation, whilst the limb is firmly supported with two hands, very near the malleoli.

b. Put the fore part of the foot in the same antero-posterior axis as the hind part by working on the medio-tarsal joint, and by firmly supporting the hind part of the foot with one hand, whilst you operate with the other on the fore part.

c. Push as far as possible the os calcis outside the astragalus.

2nd. **Rolling back the inner border of the foot.** Make the concavity of the foot into a convexity, and inversely make

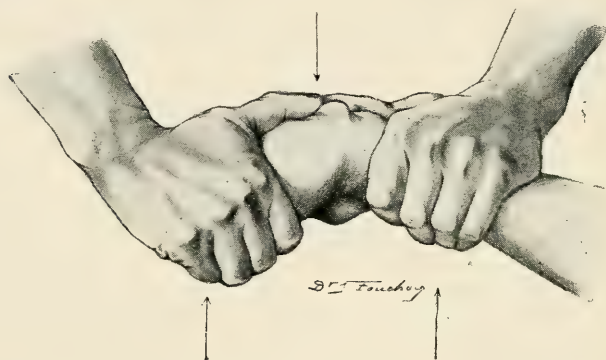


Fig. 933. — Correction of adduction. Hold the leg with one hand, the foot with the other; both thumbs are placed below the external malleolus as the fulcrum; both hands pull in the direction indicated by the arrows. The rolling back of the inner border of the foot is also corrected by the same manoeuvre.

the convexity into a concavity. Here, the movement takes place in the medio-tarsal and tarso-metatarsal joints.

If the child is quite small, we grasp the os calcis with the last fingers of our two hands, on the one part, and the first metatarsal and great toe on the other part, to redress, to make traction outwards upon the two extremities of the internal arch of the foot; and our two thumbs, joined outside upon the apex of the convexity of the external border, act by pressure in pushing the apex of the arc inwards.

We do this again ten times, twenty times, thirty times. If the resistance continue, proceed as follows; you will exercise more force.

Place the convex border of the foot on a *round* block of wood with some soft covering (fig. 934).

The internal border of the foot presents its concavity upwards : apply the thenar eminences of your two hands, with all your weight, as if wishing to bring them in contact with the table on each side of the wooden block, that is, the two extremities of the arch.

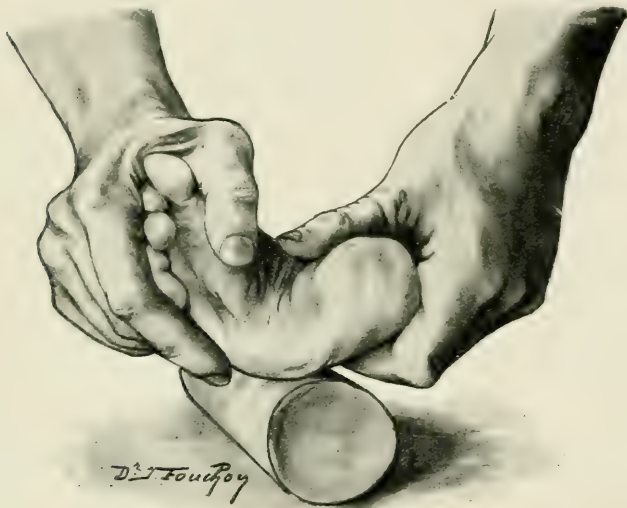


Fig. 934. — Correction of the inversion of the inner border. The middle part of the external border rests upon the block; the surgeon applies pressure over the os calcis on the one hand, and over the internal border of the fore foot on the other, to undo the deformity.

Do not be afraid of breaking it; proceed, on the contrary, *as if you wished to break it*; you will not succeed in that. Lean then with all your strength and, in children eight years of age and upwards, even let an assistant place his hands upon yours. Press systematically, and as vigorously as you are able, for eight, ten or twelve minutes, until the foot makes no more resistance. does not any longer return to its defective shape, no longer makes an arch on the inner side; or at least until, with two fin-

gers, one at the heel and the other at the great toe, you easily obliterate the concavity and maintain it in hyper-correction. This manœuvre not only unrolls the internal border of the foot, but acts usefully on the adduction of the fore part of the foot and somewhat on the concavity of the sole.

3rd. **THE inner border OF THE FOOT IS raised upwards AND**

IT'S outer border depressed.

Depress the one and raise the other. It is difficult, nevertheless capital. You will set to work by immobilising the limb firmly by the help of an assistant, and you will grasp the two borders of the foot with your two hands, of which the thenar eminences and the thumbs will be under the sole, whilst the other



Fig. 935. — Correction of supination. The four fingers of the right hand grasp the superior and internal surface of the foot and depress it, the palm of the left hand raises the external border at the same time.

fingers will embrace the two halves — internal and external — of the dorsal surface of the foot. You move the foot up and down, the hind part of the foot especially, by lowering the hand which holds the internal half of the foot, and raising the other. You will persevere for some time, vigorously, methodically. A good manœuvre is to endeavour with the inner hand to grasp the scaphoid and the internal part of the os calcis, and to make traction on the upper portion with all your force, upwards and downwards, as if to tear the internal ligament which rivets them to the tibia.

You will soon feel the ligament stretch, creak, crack, break, — which is a very good thing, because the ligament is the principal obstacle here.

4th. There remain **equinism** and **hollow foot** (fig. 936 and 937). — By raising the point of the foot, you endeavour to make the astragalus re-enter its natural position. It is necessary to widen the two divisions of the joint surface in order to effect this; this temporary separation has no inconvenience.



Fig. 936. — 1st step in the treatment of equinism. The left hand grasps and immobilises the instep, the right hand moves the fore part of the foot up and down round the medio-tarsal articulation.

But note, that in grasping only the fore part of the foot, you will deflect especially the medio-tarsal articulation, which is on the whole excellent, since you are going to **obliterate thus the hollow foot** and to transform the concave sole into a convexity. — without having to cut the plantar aponeurosis (the vigorous and repeated orthopædic manœuvres cause it to give way, without the help of the bistoury).

At the same time, if the movement is very vigorous, it affects a little the tibio-tarsal joint: **this does not suffice** to obliterate the equinism, even when it appears to do so.

Do not rely upon this appearance.

I will explain myself. It will often seem to you, when you have raised the point of the foot upon the medio-tarsal joint, that the apex of the heel is sufficiently lowered.

This is not exactly so. The os calcis has not descended enough; it is the panniculus adiposus under the os calcis, very thick, which has produced the illusion.

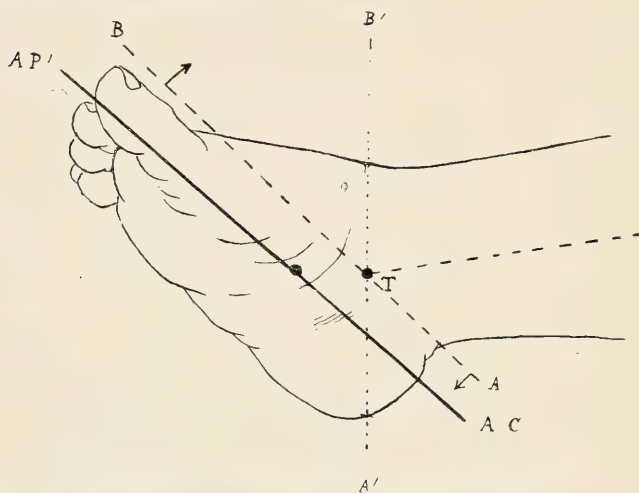


Fig. 937. — 2nd. step of the correction of equinism. T. axis of rotation of the tibio-tarsal joint after division of the tendo Achillis, the axis of the foot A. B. revolves round the point T., in order to take the position A'B'.

In reality, the os calcis still remains very high, well above the point where it ought to be.

To bring it down, you grasp the bone very firmly and depress it by a prolonged effort, while the limb is firmly held by an assistant; you will then seize with the curved fingers of one of your hands the posterior projection of the os calcis and draw it down, whilst with the other hand, spread over the sole, you push the foot with an energetic movement from downward upwards, and endeavour thus to make the astragalus re-enter its original seat and to move backwards and upwards the massive astragalo-calcaneal joint.

Repeat this manoeuvre for three, four or five minutes, with

great force, and you will nearly always succeed, in infants under one year of age, in obtaining sufficient depression, by stretching the tendo Achillis and the powerful fibrous ligaments which unite the os calcis to the bones of the leg. One feels these give way sometimes with a creaking, a special crumbling, identical with that produced in sub-cutaneous rupture of the adductors of the thigh (v. p. 449, fig. 447).

If the os calcis is not brought down — which will be the case in nearly all children over a year old, and occasionally in some

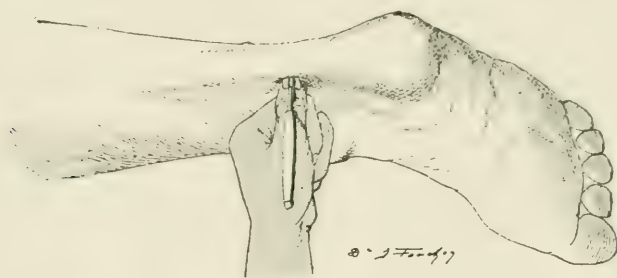


Fig. 938. — Division of the tendo Achillis : one pushes in the tenotome against the anterior surface of the tendon; the edge of the tenotome is then turned towards the tendon; one has no reason to be afraid of wounding the nervo-vascular sheath.

below that age — have recourse without hesitation to the tenotome. Perform a complete sub-cutaneous section of the tendo Achillis, at 2 centimetres above its insertion (fig. 938 to 941¹).

The **section is much easier at the end** than at the beginning of the sitting.

Because, at the beginning, before the correction of the inversion of the internal border, the tendon is very near the posterior tibial vessels and nerves, for it has followed the rotation of the calcanean tuberosity inwards and upwards (v. fig. 940).

On the other hand, at the end, after the *straightening* of the internal border, the tuberosity is carried back (and the tendon Achillis with it) outwards, so far from the vessels that there is **no risk of injuring them**.

1. See also, for the technique of tenotomy, fig. 731 and 732, p. 675.

The section performed, you place a tampon over the small wound in order to arrest bleeding. This small wound does not

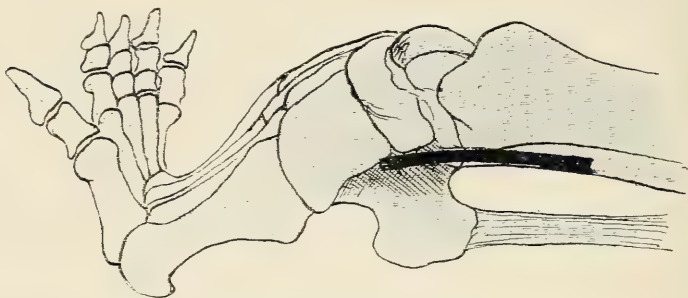


Fig. 939. — Pathological anatomy of club foot. Schema showing the relations of the tendons to the vessels.

measure more than a few millimetres in length. It is useless to suture it.

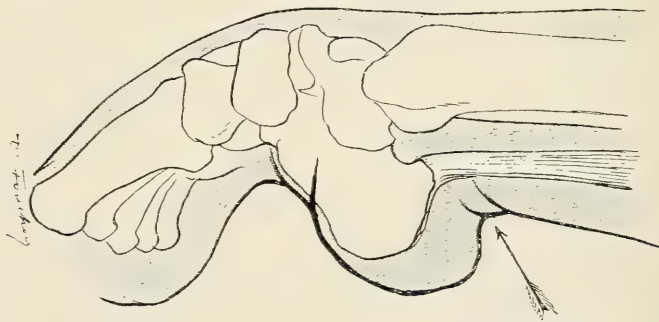


Fig. 940. — In equino-varus, the os calcis is turned about in such a way that the posterior surface becomes the superior; its postero-superior border approaches the tibia, taking with it the tendo Achillis; the tenotome ought to seek for the tendon at the bottom of a depression sometimes very considerable (compare with this figure the following one which represents the normal foot). It will be necessary to cause the tenotome to work at its point by small cuts, repeated until the os calcis allows of its being depressed.

It is by no means necessary to divide the peroneo-calcanean ligamentous fibres.

When the tendon has given way, the bone has always descended sufficiently to allow you to grasp it firmly with your

fingers, and, by pulling it again downwards, you will succeed in rupturing the ligamentous fibres which are now isolated.

It is finished. You make some concerted movements of correction before passing on to the fixation.

If you have not been able to bring down sufficiently to your liking the internal border of the foot (especially the hinder part) you proceed to complete the depression now that the os calcis is well down. At the same time, the raising of the external half of the sole and abduction are then easily completed.



Fig. 941. — A normal foot.

You will take the precaution of verifying that the hyper-correction is maintained with two fingers, without any effort.



Fig. 942. — Correction with which one must not be content, in spite of its appearing to be sufficient. One ought to obtain a very free hyper-correction, such as that in fig. 944 and 946.

You ought not to stop the manœuvres before having obtained the following result :

The foot in real **abduction**, the axis passing by about 45° or 50° outside the prolonged axis of the leg;

The **internal border** of the foot **distinctly convex**;

The **external border concave**;
 The **internal** border placed **lower** than the external;
 The **heel lower** than the point of the foot;



Fig. 943. — After the manœuvres of correction, the foot ought to be found flexed at an angle of 45 degrees, it's external border straightened in such a way that the sole is quite convex.

It ought to be possible to flex the foot at a very acute angle upon the leg.

The **sole** of the foot **convex**, whereas it was formerly concave.



Fig. 944. — The **minimum hyper-correction** which it is necessary to obtain.

On a level with the medio-tarsal joint, beneath the sole, instead of the concavity we had, we have now a convexity. On the upper surface, the prominence of the astragalus has disappeared.

Notice this important point; I return to it intentionally, it is that **one must never commence** forcible redressment **by the division of the tendo Achillis**; outside the reason already given,

you would deprive yourself of a precious fulcrum for the deflection of the fore part of the foot upon the hind part, that is, for transforming the hollow foot into a convex flat foot. It is always at the end of the seance that you would proceed to this division.

By making no more, or almost no more, manœuvres on the foot at this stage, you will run no risk of infecting the small tenotomy wound.

You will cover up the wound with an aseptic dressing and a light wool compress, and you will then be able to pass on to the application of the plaster apparatus.

The correction has required from 15 to 20 minutes, in children of from one to two years of age—but half an hour, three quarters of an hour, and even longer, in patients of from five to fifteen years of age—in spite of you having operated with much spirit and vigour, and that you have been well assisted, which is necessary. You must have two or three strong assistants who are able to replace you for a moment, when you are fatigued. Thanks to them, the operation will be as short as possible; and you would scarcely be able, in fact, to prolong narcosis beyond from 20 to 25 minutes in children of from 1 to 2 years, and beyond three quarters of an hour in the oldest.

It is necessary then, that everything should be finished in that space of time. If, exceptionally, the correction is at the moment insufficient, it would be better to stop there and complete the redressment later, at a second sitting.

B. — Maintenance of the Correction. Construction of the Apparatus.

The result obtained, one must maintain it permanently.

To do this, you will apply, from the toes to the mid-thigh, a plaster apparatus over a very thin layer of cotton wool, or rather over a stocking, or a sleeve of a jersey, well adjusted, without folds. You will make the application very carefully, with plastered bandages, exactly, without pressure, and avoiding folds and creases, in front, over the instep; to avoid these, you will cut the bandage in

several places, which facilitates the regularity of the application.

You will take great care not to pull strongly upon the bandage on the foot, as if to redress it; and, after having finished the



Fig. 945. — Insufficient apparatus; not enough flexion; more than that, the great toe is not sufficiently supported.

apparatus, you will not push nor press upon the plaster, to obtain an addition to the correction, — because, that would produce, on a level with the fold of the instep, a projection of plaster



Fig. 946. — Plaster apparatus well made; the great toe is well supported, flexion is at 45 degrees, the internal border of the foot is lower than the external; an opening has been made on the anterior surface of the instep to avoid too great pressure on the soft tissues.

which might force its way through the skin. It remains obvious that one has the right and the duty of supporting the sole of the foot to the extent that is necessary to recover entirely the correction previously obtained.

To go beyond that would be to produce **sores** at the points

of pressure, at the places where the fingers were applied, because the foot, being like a spring, would then have a tendency to press against the plaster. More than that, the position of the foot should be exactly the same from the first turn of the bandage to the setting of the plaster. You would thus avoid wounding the skin.

If, in spite of all these precautions, the plaster should appear to you to be questionable, either because there exists, perhaps, a certain pressure at some point, or because you have been unable to avoid folding the bandage, for example, in front of the instep, you make with the bistoury a small square opening opposite that point, closing it afterwards with squares of cotton wool held in position by a muslin bandage.

I have scarcely any need to describe what is necessary to be done in cases where the toes have become **blue**, or **anæmic**, or **insensitive** to a prick, because those things will scarcely ever happen if you follow the indications already given.

However, if such a condition is produced (one must always look ahead) **you will lay open the anterior surface** of the apparatus, begining at the lower part, separating the borders for 1 or 2 cm. cutting higher and higher, until you see the circulation in the foot regulated.—then you will raise the borders, slipping under each of them a thin layer of cotton wool, — and lastly you will fill up the anterior longitudinal gap with another strip of cotton wool and apply a soft bandage.

From the way I have dwelt upon these directions, it may seem to you that a sore is much to be feared. That is not so. I have given you this wealth of precautions in order to put you on your guard, even in very small children — not because a sore is exactly dangerous, but because it is a worry and a source of delay. If sores do occur¹, it is necessary, very often, to remove the plaster and attend to their cure, which is sometimes slow, before replacing the plaster. One may not do this without first remaking the correction, which has meantime become partially lost.

1. See p. 72, *how to recognise them and how to treat them.*

C. — After-Treatment.

After-care. — For small children, there is another precaution to be taken, of the greatest importance. It is to prevent the urine getting under the plaster and softening it.

To preserve the skin and the apparatus, you will recommend the parents to cover the plaster with some kind of impermeable linen, fitting closely round the knee. One can also raise the feet of the child. It is because of this inconvenience, in small children, that the apparatus should stop short at the knee, whilst in older children one continues it above the knee, in order to slightly correct internal rotation of the limb.

However, if, in spite of everything, in the younger ones, the apparatus is softened, or if the urine penetrates and sets up an erythema of the skin, one will simply take off the apparatus for the time being. One dries the skin, dusts it with starch powder and prepares a new plaster as soon as the skin has recovered.

The apparatus is taken off after three or four weeks in the case of adolescents, in whom the correction has not been completely obtained in the first instance. One then completes the correction and fixes it in a new plaster.

It is especially in cases where the correction has not been completely obtained at the first sitting, that one is tempted, after the application of the last turn of bandage, to complete the correction by making energetic pressure through the plaster. It is especially then that one must resist the temptation.

But I have sufficiently insisted upon this point.

If the correction has been well acquired, and if the **plaster** is well tolerated, **one leaves it on for two months**. If it is a case of a child who can walk, one allows him to **walk on the third or fourth day**, with a boot or a slipper intended to protect the plaster from damp, rough usage or unnecessary wear.

I say from the third or fourth day, because by that time, all pain has disappeared from the foot and the plaster is quite firm.

The weight of the body can only accentuate the correction, the shape and modelling of the foot.

At the end of two months, when you have removed the plaster, you will verify the correction, then apply a **second plaster for two or three months more**, in the hospital at any rate. — then a **third** for the same length of time, after which the foot is set completely free. The **entire treatment** has taken from **8 to 10 months**.

In private practice, one may, before applying the second plaster, take a mould in order to have made a celluloid boot which will keep up the hyper-correction. This allows one, fifteen days later, when the boot has been made, to do away with the immovable plaster and to see the foot every day, to see to the return of its pliability as well as to the treatment of the muscles by massage, electricity, and voluntary movements.

After each sitting, one replaces the celluloid boot, with which the child walks as he walked with the plaster. He keeps on the boot also during the night for the first six months, without which the correction might be lost.

With this treatment of the muscles and this conservative boot for seven or eight months, the foot remains well corrected. It is cured when the child can voluntarily carry the foot into the position of hyper-correction, and, consequently, can flex it at an acute angle.

In order to assure yourself of this, place him upright and tell him to lower himself without raising the heel from the ground. It is necessary that the flexion of the leg and of the foot on this side of the right angle measure at least from 30° to 40° . If the child cannot do this, it is because there is a suspicion of a relapse.

It is the same if the elevation of the external border and abduction of the great toe are found to be insufficient. — which can only happen if one has not ensured enough hyper-correction or not enough support.

If this fault has been committed, it may not be irreparable: but it should be dealt with without delay.

It is sufficient to make a **complement of correction** with or without chloroform, and to support the foot anew, duly

corrected this time, in a plaster. After six months of the celluloid, you order to be made for the child an ordinary boot with rigid supports, but especially with one or two centimetres of elevation on the external border, a boot which he will keep for 1, 2, 3 years during the day. With such a boot, the child ought to be able to walk as well as anyone. At night, you will support the foot, if need be, with our usual lever-boot.

There will remain only a certain amount of wasting of the calf; sometimes a tendency to internal rotation of the lower limb. But this tendency will scarcely ever exist if one has really effected a hyper-correction of all the factors of the deviation.

If it exist, but is only slightly pronounced, do not trouble about it; it will adjust itself alone, by an instinctive effort of the child, who redresses himself in the course of his growth.

If it is very marked, make a large celluloid apparatus, articulated at the hip, at the knee and at the instep, which will support the entire limb in slight external rotation.

This apparatus will be worn day and night, or only at night, until the disappearance of the tendency in question.

In short, the **after treatment** is easy and the cure remains permanent if the **first hyper-correction** has been **pushed far enough**.

On the contrary, **if hyper-correction has not really been obtained**, the **consecutive treatment** by means of boots and massage will be “**diabolic**” for you, and when it is handed over to the parents, it will give, in that case, no result, and you will not avoid relapses.

Treatment of Club Foot of Old Standing.

It remains for us to say a word on redressment of the old standing club feet of adolescents.

Do we, here, have recourse to machines which bruise the foot in shaping it?

Or rather to surgical operations, where one does not hesitate to take away one half of the skeleton of the foot, if

that appears necessary, in order to obtain complete correction.

Well, if you are a surgeon, let it be so! Do this: proceed in the manner of Championnière, who extirpates all the bones which resist him, and deossifies the foot.

In the same way, if you are in the habit of using the osteoclast, make use of it.

But that is not the case with most of you. Is it to be said that you are to give up the treatment of these old club feet? No; you will be able to arrive at a result (which will stand comparison with those given by surgical operation and osteoclasis) by another method, which is quite within your scope. It is, simply, **forcible redressment** with section of the tendo Achillis: it is, in fact the redressment we have just studied.

You will proceed in the same way, but it is especially here that it will be indispensable to have at least 3 or 4 very strong assistants whose strength, added to your own, or taking your place when you want a few minutes "to take breath", will permit you to obtain the same effect as a powerful machine for moulding, but with much more certainty. — Here you are able to go as far as an hour of narcosis and sustained efforts.

If, in such a case, a very old one, you do not succeed at the first attempt, what then stops you, after a month or two, giving a second, a third **supplementary sitting** of correction under chloroform? — I advise you even not to push the correction at one sitting, when the correction is accompanied by a stretching of the skin, which might compromise its nutrition.

Finally, you will have a result which will not be so fine, without doubt, as the modelling of a foot of 2, 3 or 4 years, but which, from the point of view of functional utility, will be very good.

And you will obtain it by a method of which you need have no fear, which does not admit of, **if made at 2 or 3 sittings, any of the uncertainty of surgical operation** and of **the use of machines**, more or less brutal, and always slightly ambiguous.

The consecutive treatment is, then, the same as that above.

CHAPTER XVI

THE TREATMENT OF TORTICOLLIS

I wish to speak here only of **congenital torticollis**, or **true** torticollis (not of acquired or symptomatic torticollis). True torticollis is due to a contraction of the sterno-mastoid muscle, causing an inclination of the head on the same side (by contraction of the clavicular head) and a rotation of the chin to the opposite side (by the contraction of the sternal head, fig. 947). In the place of the muscle, one feels and sees a **hard projecting cord**.

There may be other contractions, the other muscles of the neck may be involved; but it is exceedingly rare, at least at the outset.

The contraction of the sterno-mastoid muscle exists from birth or occurs in the early weeks after birth. It is **permanent**; it is **painless**.

These are the characteristics which will enable us easily to distinguish true torticollis from torticollis due to rheumatism, acute and temporary, or from chronic acquired torticollis, which may appear at any age, and is generally symptomatic of cervical Pott's disease.

This last mistake has been made and therefore it is really worthy of a little attention in order to avoid it. The history, the sensibility to pressure over the spinous processes in the case of Pott's disease, the puffiness of the region of the nucha, the sensibility to all movement, the digital examination of the pharynx, or the examination of the neck in order to track the possible existence of an abscess by gravity; these are most of the

elements which are necessary generally in order to make the diagnosis ¹.



Fig. 947 -- Left torticollis. Rotation of the chin to the right, lateral inclination of the head to the left.

1. When the hard and projecting cord in the situation of the muscle is wanting, it is not a question of true and essential torticollis, but an inclination of the head due to some other affection which you should search for by exploration of the region and by a general examination of the subject.

I. — AT WHAT AGE MUST TORTICOLLIS BE TREATED

Instead of waiting for seven years, as some surgeons have decreed — I really do not know why — it is necessary to *deal with it as soon as possible, immediately the diagnosis is made.*



Fig. 948. — Up to 6 months or a year, redressment of a left torticollis by simple manipulations. An assistant gives to the head a position opposite to that of the deviation (in the direction of the arrows); the surgeon pushes the shoulder downwards and kneads the muscle with his thumb (see fig. 952).

First and above all, because one avoids thus the appearance of secondary lesions, by no means negligible, which torticollis brings in its train in the long run, in particular, atrophy of

the corresponding half of the face and head, and a lateral deviation of the vertebral column.

Afterwards, because at the onset, and up to 3 years, the purely mild orthopædic measures suffice, without tenotomy.

Often, it is true, they will not shew the children to you until later, at four years, eight years, ten years...

II. — TECHNIQUE OF TREATMENT AT DIFFERENT AGES

A. Up to six months : *Correct by simple manipulations.*

Correction is obtained at this age easily, in two or three sittings, with manipulations and massage of the contracted muscle (fig. 948). One presses it, one kneads it, one stretches it without violence, but not, nevertheless, without a certain amount of vigour. During these manœuvres, one causes the two extremities of the muscle, that is to say, the head and the clavicle to be removed further apart (this by traction on the shoulder) by anyone at hand. The sitting lasts from 4 to 5 minutes. You arrive by this first sitting at a straight position, which you maintain in the way described further on.

The next day or the day after that, a new sitting for manipulations which lead, at the second or third time, to a free hyper-correction, that is to say, to a torticollis on the opposite side (the ear of the sound side almost touches the corresponding shoulder, whilst the chin is turned round, on the contrary, towards the affected side).

Maintenance of the correction.

Here is the most practical and the most simple form of bandage for preserving the hyper-correction. It may be prepared by all mothers, supervised and modified by them according to the needs of the case (fig. 949 to 951).

The head is fixed by a skull cap or an ordinary bonnet, with a strap made of two ribbons tied under the chin. At the lower part of the bonnet one fixes with pins the upper extremity of two bandages of linen or soft muslin, one behind the ear of the affected side, the other on a level with the ear of the sound side.

The two bandages pass in front of the axilla on the sound side and are pinned below to the child's knickers or to a girdle made



Fig. 949. — Bandage (face view) for maintaining the correction made of a left torticollis. The bandage which goes from behind forwards, by passing below the ear, maintains the rotation of the chin towards the left side (it was turned towards the right before correction); the second bandage which one sees inserted into the bonnet, above the ear, is intended to produce lateral inclination of the head to the right. One increases at will this lateral inclination and rotation of the chin. The bandage acts better than a plaster apparatus.

with two or three turns of Velpeau bandage. On pulling upon the first of these bandages, one increases the rotation of the chin towards the affected side; with the second, one increases the

inclination of the head upon the sound shoulder. The bandage is easy to take off and replace, which facilitates the child's toilet. I can promise you that in 6 or 8 weeks the cure will be obtained, if the bandage has been well applied and looked after.



Fig. 950. — The same bandage seen behind. One sees that, by adding a bandage here or there, one can easily give to the head the attitude one wishes.

It is obvious that, if necessary, in some exceptional case, one might prolong the use of it for several weeks more.

B. From 6 months to 3 years : *Redressment under chloroform by rupture of the tendon with the thumbs.*

At this age, the treatment by manipulations may demand too much time and be too difficult to overcome the resistance of the tendon already over contracted.

It is simpler, more expeditious, and more certain to break at one sitting the shortened tendon. There is no need of the bistoury for this; one accomplishes, at this age, the sub-cutaneous rupture of the tendon solely by the pressure of the thumbs through the intact integuments (fig. 952).



Fig. 951. — The same seen in profile.

But it is necessary to have the help of chloroform. The child is put to sleep, you have the head grasped by one assistant, the shoulder by another. In the absence of experienced assistants, you may make use of improvised ones, whose movements you direct. Their duty is to pull on the head and the shoulder in opposite directions in order to stretch to the maximum the contracted tendon. When this appears to you well in evidence, you attack it with your two thumbs (placed one against the other) on its inner border, at **one or two centimetres** above its lower attachment. You bear and press upon the cord more and more vigorously, with an approximate force of six or eight kilograms; you press by rhythmic jerks, until

you feel the tendon give way and break, which is generally accompanied by a slight shock, at the same time that the skin is depressed under your fingers, and that the assistants feel the resistance which had opposed the hyper-correction of the head, give way.

This done, one stretches by kneading the neighbouring tissues of the neck and the vertebral column itself, because all the fibrous and ligamentous elements of the region are found to

have undergone contraction secondary to the shortening of the sterno mastoid.

The Maintenance of the *Hyper-correction*.

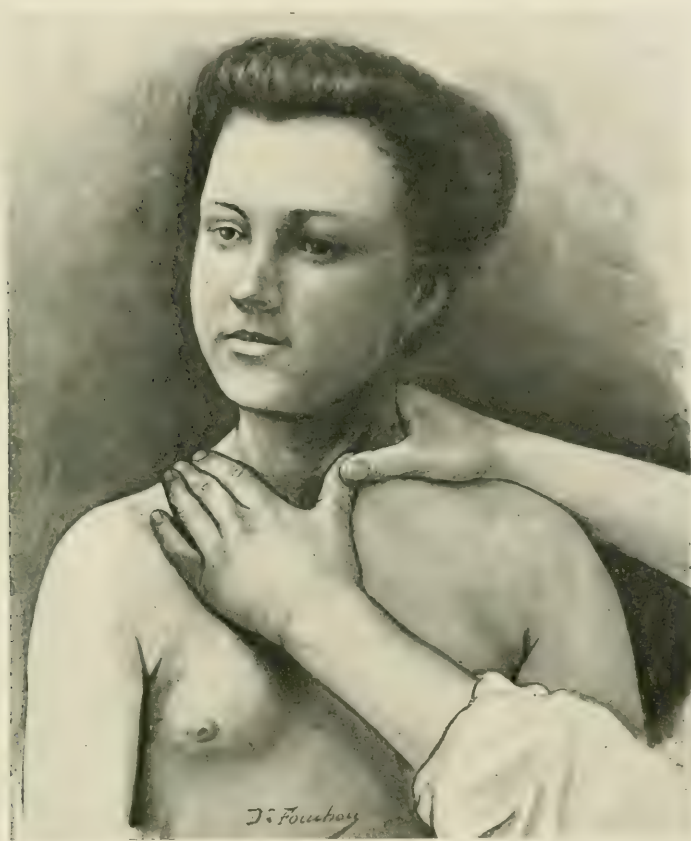


Fig. 95. — In children of less than three years, rupture of the tendon by pressure of the thumbs through the integuments — during which one or two assistants redress the head (in the direction shewn by the arrows in fig. 948) and depress the shoulder on the affected side (see also fig. 447, p. 449).

Put on a plaster? Yes, if you wish to, and if you know how. But I would warn you that a plaster fixing the hyper-correction at the degree desired, without discomfort or injury,

is very difficult to effect in sleeping children, whom one ought to keep in a sitting position for ten minutes at least, for the proper application of the apparatus. With these reservations, you may apply a plaster “minerve”; construct it in the way given by us on p. 306, for Pott’s disease, stopping the cosset at the middle part of the thorax.

But I advise you to apply, in preference to a plaster, a simple soft bandage identical with that described above; that is sufficient. I have used it many times myself instead of a plaster and it has always given me entire satisfaction.

C. Above three years of age : Section of the muscle. At this age, rupture of the tendon by pressure of the thumbs would require too great violence. Rather divide the muscle¹.

Should it be by the sub-cutaneous or by the open method?

If you are accustomed to the latter, if you prefer it at any price, let it be so, keep to it.

But if you have no preference, *I recommend to you sub-cutaneous tenotomy*, and this is why :

a) I consider it useless, and even bad, especially in young girls, to leave a *cicatrix* of from 5 to 6 centimetres, which will always be visible and exceedingly unsightly. And one must give this extent to the incision, a very large opening is necessary in order to see clearly into the deep tissues.

b) As to the *benignity* of the operation, one is certain of always avoiding the great vessels of the neck, if one follows the technique of sub-cutaneous tenotomy which I shall give further on.

You see, now, by the figure opposite, drawn from my own personal dissections (fig. 953), that the vessels are separated from the muscle by the thickness of the clavicle, the aponeurosis of the sterno-thyroid and sterno-hyoid muscles.

Is one quite certain of not causing lesion or inflammation

1. You may perform it even below three years, if you have not been able to break the tendon by pressure of the thumbs.

of the vessels, when one uncovers widely the internal jugular vein deep down in the tissues, as recommended by those who perform open tenotomy!

As to the *risk of infection*, it may be considered as of no

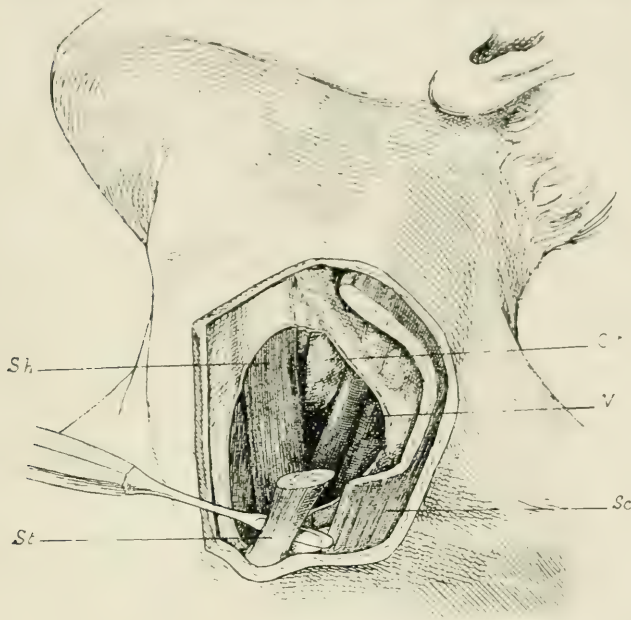


Fig. 953.

St. Sternal origin of the sterno-mastoid; *Sc.* Clavicular origin; *V.* (vessels). Carotid artery, and outside it the internal jugular vein; *Sh.* Sternohyoid; *Cl.* Thyroid body.

account, with sub-cutaneous tenotomy. One is not able to say this however, with regard to open tenotomy.

c. But one of the great arguments, perhaps the greatest, advanced by those who prefer the latter, is that it has a greater *efficacy* than sub-cutaneous tenotomy, because in sub-cutaneous tenotomy the tenotome is bound to spare some fibres of the contracted muscle.

Here is my reply :

Yes, it is true that the tenotome, in sub-cutaneous section, spares

a few tendinous or muscular fibres ; but it spares them also in open tenotomy, not fibres of the sterno-mastoid, it is true, but always and necessarily some neighbouring aponeurotic and tendinous fibres, because, in rather old standing torticollis, all the tissues adjoining the tendon of the sterno-mastoid, that is the aponeurotic fibres and the other muscles, are also contracted, although to a less degree.

If our intervention is limited to making the section of the sterno-mastoid, even if complete, we shall not have a perfect correction, any more than in club foot, if we confine ourselves to section of the tendo Achillis alone. We ought, after this resection, to knead all the tissues, stretch them, lengthen them, shape them ; and not only the soft tissues, but also the ligaments of the vertebræ and the bones ; we ought to shape the vertebral column which is always slightly deviated in torticollis.

All that one can say, is that we shall have less trouble with tendinous or muscular fibres in tenotomy by the open method than in the sub-cutaneous one.

But it is not more difficult to break the few fibres of the sterno-mastoid, spared by the tenotome, than to combat the retraction of the other tissues of the region.

By the supplementary manœuvres which are directed against these fibres we will also cause them to give way in a very complete manner. Have we not caused the entire tendon to rupture in children scarcely younger? (*see above.*)

It is for the same reason that *I advise you to divide the sternal origin of the muscle only*, which renders the operation much easier, shorter, and more harmless.

But it will *nearly always suffice*¹, not because the clavicular origin is not contracted — for it very often is — but because, immediately the division of the sternal origin is effected, we can nearly always accomplish easily the rupture, or a sufficient stretching, of the clavicular origin, by the simple manœuvres of redressment which we have just described.

1. St. Germain said he had never divided the clavicular origin, and it has only fallen to my lot three times.

The Technique of Tenotomy

- a) You will have a blunt tenotome as well as a pointed one.
 b) **One divides the tendon from within outwards**, not at a finger's breadth, but **at scarcely 1 cm. above** its lower insertion, that is, as near as possible to the sternum.



Fig. 954. — Invagination of the skin. The left index finger is pushed beneath the sternal origin, from within outwards, and makes a prominence by the side of the tendon, beneath the integument.

c) One at **first cuts the sternal origin only**, for the reason already given. The clavicular origin gives way afterwards, almost always, if one employs the orthopaedic manœuvres which have served to rupture the entire muscle in children of 2 or 3 years.

One cuts the tendon **from behind forwards**. To cut it from before backwards, as some advise, is infinitely less safe for those among you who are not surgeons.

First step : Place the head in position. — The patient is an-

æsthetised, in order to have no risk of voluntary or involuntary movements of the child. The head in a slight extension of from 15° to 20° , is held by an assistant who will move



Fig. 955. — The pointed tenotome is pushed in along the dorsal surface of the left index finger.

it when required. Another assistant stands ready to pull down the shoulder of the affected side.

Second step: invagination of the skin beneath the tendon. — The muscle being relaxed by the assistant who holds the head, you will invaginate the skin with the left index finger, from within outwards, beneath the deep surface of the tendon up to

the external border (note this well; **up to the external border**) of the sternal origin (fig. 954).

Third step : Skin incision.

With the pointed tenotome, conducted flat upon the finger nail behind the muscle, you puncture the skin in this hollow, to an extent of 4 or 5 mm., then, without removing the index finger, you withdraw the tenotome and replace it by the blunt tenotome also introduced on the flat, the cutting edge upwards.

You then remove the index finger, and the invaginated skin



Fig. 956. — The tenotome is guided by the index finger.

returns to its normal place ensheathing completely the blunt tenotome.

You make sure that the blunt point corresponds still with the outer border of the sternal origin (fig. 955 and 956).

Fourth step : division of the tendon.

Then, it is sufficient for you to turn the cutting edge forwards and to request the assistant who holds the head to give to it a position which throws the muscle into tension, that is, to incline it towards the sound side, and to turn the chin round forcibly towards the affected side.

Whilst this assistant, and he who is pulling down the shoulder, make more and more traction, the sternal origin cuts itself upon the cutting edge of the instrument, which you hold steadily.

Before the section was made, you had, with the thumb and index finger of the left hand which had become at liberty, raised the

skin forwards, so that it should not be wounded by the cutting edge (fig. 957).

All at once a **jerk**, a depression in the skin, at the same time that one obtains a hyper-correction of the head, announce that



Fig. 957. — The tenotome is turned round, the cutting edge forwards; the muscle divides itself during the movement of redressment of the head operated upon by an assistant. (With the thumb and index finger, which have become free, one pinches and raises the skin forwards so that it may not be injured by the tenotome).

the section is made; you withdraw the instrument, and place a tampon over the site of the puncture.

Fifth step : By manipulations, you set about the rupture and elongation of the clavicular origin, and the several fibres of the sternal origin, which may have escaped the bistoury.

You will accomplish this by manœuvres similar to those de-

scribed above for children of less than three years of age (see fig. 948).

Sixth step : Shaping the neck.

At the same time and *by the same manœuvres*, all the retracted tissues of the neck are relaxed, and one models and shapes the vertebral column, always slightly deviated, as we have said. One inclines it in the opposite direction.

Prolong these manœuvres for 7 or 8 minutes, but proceed gently and without any violence; violence is useless and may not be without danger.

But we return to the clavicular origin. If it has not given way, if it resist to the extent of preventing hyper-correction, which happens hardly once in twenty times, you will divide it after you have satisfied yourself as to this. In order to divide it, one follows a technique identical with that indicated for the sternal origin; invagination of the skin, etc., with this difference, that one **attacks the clavicular origin** from the outer and not the inner side, as one does for the sternal origin, and that one approaches at **two and a half centimetres above the clavicle** and not at one centimetre.

I conclude by indicating a variant of the technique, by which one dispenses with invagination of the skin. It is always possible, even in stout subjects, with a little skill, to invaginate the skin beneath the muscle; rehearse this manœuvre the day preceding the operation, to make yourself familiar with it. If, however, you do not succeed in obtaining complete invagination of the skin beneath the muscle, then, to be quite safe, in spite of that, proceed in the following manner :

Puncture the skin with the pointed tenotome **at the internal border of the sternal origin**, then replace it with the blunt tenotome working with its blunt extremity; it will go round the border little by little and pass behind the posterior surface of the muscle; you will hold it parallel to that surface, or a little inclined forwards and outwards, the cutting edge upwards; you advance until the blunt tenotome raises the skin at the external border of the sternal origin; then turn it round with the cutting edge forwards, and you finish in the manner mentioned above.

The Maintenance of the Redressment after Tenotomy.

When you have obtained a hyper-correction of such a degree that the sound ear almost touches the corresponding shoulder, you busy yourself with the means of maintaining this attitude.

For this purpose, you apply either a minerva plaster, if you know how to do it, but, I repeat it, the plaster is difficult to succeed with here, or rather, a soft bandage identical with that already studied above (v. fig. 949 to 951). One preserves the hyper-correction for 15 or 20 days, after which the child is set at liberty.

After-Treatment.

One massages, and tries to overcome stiffness, making the patient take active exercises of redressment consisting in carrying the head in all directions, and especially towards the sound shoulder, and you will supervise its return, which is made spontaneously, in ten days.

If the head appears to you to return rather too quickly, stop its progress by again applying a bandage either by night only, or by day also. You will keep watch in this way until the result may be exactly what you wish, neither too much nor too little, neither on this side or that of the necessary degree of correction.

To obtain this ideal, I can tell you that the bandage indicated (fig. 951) will be a help to you, more useful than all the exercises in the world, — because exercises are temporary, — whilst the bandage may act night and day, if need be.

Conclusions.

The simple technique which I have given you is that which unites all the advantages you desire : **security, facility, and efficacy.**

If you follow it exactly, especially if you know how to use the simple bandage mentioned for its maintenance, I promise you that you will always succeed, and that the question will never present itself to you, namely, that it may be necessary to extirpate the entire muscle, from the sternum to the mastoid process, as some surgeons have not feared to do, intending, as they say, to give a better chance of avoiding a relapse of torticollis!

CHAPTER XVII

LITTLE'S DISEASE

Little's disease is an affection of the nerve centres, of congenital origin, characterised especially by a contracture of the lower limbs -- whence there is difficulty or even impossibility of walking, -- accompanying nearly always a weakened intellect.

You know those cases well (v. fig. 941 and 942), those backward children of 3, 5, 8, 10 years, who do not walk yet, who do not know even how to stand on their feet, and who, when one tries to place them upright, touch the ground only with the points of their toes, while the knees and the hips are not able to be straightened. Watch them move their limbs, they throw them about spasmodically, knocking them together and crossing them.

Nearly always, they are brought to you solely for this inability to walk.

It is that which strikes and worries the parents. You, who are not blinded by parental affection, easily recognise that it is not only the locomotion which is backward, but also, and still more so, the brain and intelligence of the child. The embarrassment of his speech, his physiognomy more or less sluggish or grimacing, his squinting or rather oblique way of looking, his inco-ordinate or choreiform movements immediately inform you as regards this.

Let us return to an examination of his lower limbs. They are stiff as bars of steel, and agitated by slight, almost incessant, epileptoid tremors. The reflexes are exaggerated. -- Babinski's sign, etc.

Consequent on the ordinary localisation of muscular contracture of the limbs, the feet are deviated in pure equinism, or generally in equino-varus, -- sometimes in valgus. The limbs are bent, the thighs are flexed and rotated inwards, but especially are intimately held one to the other, so that it is extremely difficult for you to separate them.

If you try to bring together the different segments of the lower

limbs into a good attitude, you have to contend against a resistance almost invincible ("tetanic" or "cadaveric" rigidity of the joints) proceeding from spasmodic contracture of the muscles situated on the side "of the concavity of the deviations".



Fig. 958 and 958 bis. — Little's disease (of grave variety); expression stupid, thighs flexed, legs flexed on thighs, feet in equino-varus.

The spasm attacks especially the posterior muscles of the limbs, the flexors of the knee-joint and the adductors of the thigh.

On the other hand, the muscles "of the concavity" of the deviations may be partially paralysed. The name "spastic paralysis" sometimes given to this malady recalls the two characteristics: enfeeblement of certain muscles, and contracture of their antagonists.

The malady strikes less often and less profoundly the muscles of the trunk or of the upper extremities.

I point out simply the troubles of nutrition of the skin: the legs and feet are cold and blue, sometimes of an asphyxiated tint in certain very grave forms. The sphincters are unaffected, sensibility is intact.

Is there any need to say that this malady exists in all possible degrees and that one observes it from the almost normal child who walks alone, but drawing the feet heavily on the ground (as if they were held by weights of 20 kilogr.) and knocking the knees together, up to the completely helpless subject, whose legs are bent on the thighs and the heels fixed to the buttocks? The same degrees exist in the mental weakness of the children, from a hardly appreciable sluggishness to absolute idiocy.

Let us add that nearly all are **born either prematurely**, at the seventh or eight month, or in a state of **asphyxia**, following a **difficult or prolonged confinement**. It has been remarked that it is nearly always the latter cases which are most wanting from the cerebral point of view.



Fig. 959. — Little's disease of medium gravity.

Some authors are willing to recognise in this malady an hereditary taint of syphilis, which appears to me to be far from constant; the presumption is, however, strong enough¹ to cause one to submit such children to specific treatment. We say now that this has proved nearly always inefficacious, even in cases where syphilis has been proved to exist in the parents.

The Course to Follow.

What will you do for these children? Is there really anything to be done?

1. In two cases of Little's disease, M. Dejerine has found vascular lesions in the spinal cord analogous to those of syphilis.

Cure. — Indispensable orthopedics.

Well, yes, if it is not a case of complete idiocy.

How are you to recognise this contra-indication? It is less easy than at first sight appears.

It is evident that you will not trust to the parents in what they always affirm to you, that the child is "remarkably intelligent", "simply nervous" or "absent minded". But remember to guard against the opposite error, which you might commit on the strength of your first impression, which would be nearly always disastrous; you will take these children at first to be idiots, whilst, if you take pains to study them and observe them for some time, you will arrive at the conviction that the intelligence, at least three times out of four, is not absent, but that it is only retarded and dormant. You will find cases even, where the intellect will be normal, and this may be observed in children having an almost complete loss of power in the legs; that is, the cerebral manifestations and the muscular manifestations have not necessarily developed to the same extent.

Note that, if the gravity of the intellectual troubles constitute for you, as they very often do (once in four times), a contra-indication of all orthopædic treatment, on the other hand, the degree, even when accentuated, of the muscular lesions, ought never to be a contra-indication of this treatment.

You will see on p. 873, from the explanation of fig. 962, what we have been able to do for a patient of fifteen years, with complete loss of power of the lower limbs, but whose intelligence was almost normal.

So that, if the child is not an idiot, you ought to submit him to an orthopædic treatment, and you will arrive at half cures, and, in some cases, at almost complete cures.

You will do so, provided that you have faith, a sincere and living faith, that will make you follow these children, without respite and without impatience, for a year, or even sometimes, two years.

THE TREATMENT OF LITTLE'S DISEASE

One ought to have a double objective and to concern oneself:
1st. with the brains of these children; 2nd. with their legs.

1° PSYCHOLOGICAL TREATMENT

Commence a moral and psychic treatment against the retarded intellect. This part of the treatment will be confided to the mother; it is necessary to impress upon mothers that they

must devote themselves to their children and not hand them over to the care of mercenaries.

They alone can and will, by their infinite patience, which knows no discouragement, assist in the development of those backward brains and give them, by **teaching them to have a will** of their own, the discipline and the regulating rein of which they have need, in order to arrive at the command of their muscles.

They alone will not cease to repeat to their children, from morning till night, the same words, the same movements, the same exercises.

Tell the parents plainly that they must do this without respite, and without any fear of fatiguing the brain of the child.

Every gain obtained on the side of the brain will react happily on the function of the muscles attacked by contracture. The more the brain commands, the more will the reflex spasms be lessened, and the more will the subject be capable of educating his limbs with a view to his eventually walking.

2nd. ORTHOPÆDIC TREATMENT

The local and direct treatment of the deviations alone concern you : it is as necessary, in order to arrive at a result, as the psychological treatment of which we have spoken.

A. **Chosen age for the orthopædic treatment.** — You will commence it as early as possible, that is, when the intelligence will permit it. It is necessary that the child help himself in order that the treatment may be efficacious : it is necessary that he know a little of what is required of him, when one says, “ Be careful ”; “ Hold yourself well ”; “ Straighten yourself ”, and learn how to make an effort, as little and of as short duration as may be.

There are some who will respond very early ; others, on the contrary, who will not react intelligently before 3, 4 or 5 years. You ought to **wait** for the **awakening of the will** of the child before commencing the local treatment.

B. **Technique of the local treatment.** — It consists in

placing the different segments of the lower limbs in the position most favourable for walking, with slight hyper-correction. Thus, the point of the foot which falls will be drawn to a right angle (or rather, to an acute angle) with the leg; the flexed limb will be placed in extension (or rather, hyper-extension), as well as the thigh once folded on the abdomen; and in the same way again, the thighs which were brought closely the one to the other will be separated and kept separated.

1st. Redressment of the deviations.

This is obtained, as in infantile paralysis (v. p. 673), by orthopædic manœuvres with or without chloroform, with or without tenotomy:

a) Benign form. If it is a slight matter, if the deviation is scarcely marked, the correction is made without the bistoury and without narcosis.

b) Ordinary form (v. fig. 958 and 959). — The deviation is sometimes very much accentuated (but it is only so in the lower limbs, the trunk and the upper limbs being exempt). It will be necessary for you here to have the assistance of tenotomy and chloroform.

In the foot, one divides the tendo Achillis or, better, one elongates it by the sub-cutaneous route in the manner we have already indicated¹ (p. 677). When it is only necessary to gain one, or one and a quarter, centimetre (v. fig. 733), simple tenotomy is sufficient. In other cases, elongation is necessary, because, after division, the fleshy portion of the muscle is so pulled upon from above by contraction, that the reunion of the two fragments cannot be effected, whence a very marked deviation in talus, replacing the original equinism, but very little better.

1. For little as the spasm may be marked, division, with or without lengthening of the tendon, is better than it's forced extension by simple redressment. To overcome the cramps, often very painful, it is necessary to use, besides tenotomy: *a.* the psychological means already pointed out; *b.* massage and baths; *c.* all the well known antispasmodics: bromides, valerian, etc. But success does not come at once — it takes time; these spasmodic contractions hardly ever disappear before several months of treatment.

At the knee, one will divide the tendons in the popliteal space.

For tenotomy in the popliteal space, follow the technique described on p. 681, which enables you to divide sub-cutaneously the biceps itself, without any fear for the sciatic and external popliteal nerves, which are situated at a centimetre and a half inside the tendon.

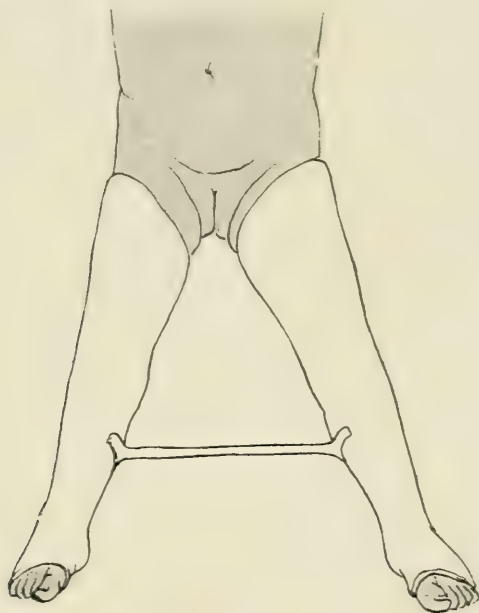


Fig. 960. — A stretcher intended to assure the abduction of the thighs. One is able to increase or diminish abduction by placing the stretcher higher up or lower down.

In the thigh, for division of the flexors or the adductors, one operates in the manner described in Chapter II on Hip disease (v. p. 451).

2nd. Maintenance of the Redressment.

The correction, or rather hyper-correction, of 20° or 25° of the feet, of the knees, and of the thighs, having been obtained by one of these procedures, whichever it may be (forcible redressment, tenotomy or rupture of the tendons) it will be maintained

for two or three months in a plaster apparatus¹ (fig. 960).

3rd. **Placing upon the feet and exercises in walking.** — Place the child upright and try to make him walk with his apparatus, a **few days after correction**, when he has recovered from the slight traumatism. **Do not wait**, do not leave him to rest for weeks or months as is generally done; he would become still more incapacitated.

Oh! you see well enough it will not be easy to make him walk, even after all his deviations have been redressed.

At first he will not know at all how to keep upon his feet; it will be necessary to assist him, to support or rather to carry him almost entirely. The leg and the foot, maintained in the plaster, will necessarily remain in the position desired; but the patient will bend forwards at the hips, which have not been included in the plaster, as we have said.

One ought to remind him every moment to make an effort to raise the trunk which falls forward. If you or his mother have taught him to exercise his will, he strives to hold himself well, but he cannot do so alone, it is necessary to help him constantly or nearly so, with one or two hands held out to him.

However, one will repeat these attempts from morning till night, without ever being tired or discouraged, with incessant repetitions: “hold on”, “straighten yourself”...

1. In reality, in order to maintain abduction of the thighs, the plaster should include the pelvis, but the patient will thus be too confined and you will not be able to make him walk with the apparatus. Therefore your plaster, beginning at the base of the toes, ought to stop above opposite the trochanter. You will then leave the hips free for attempts at walking, and you will attend to the maintenance of abduction of the thighs only during the periods of repose of the child, that is, all night and in the day time at the intervals of the exercises. To do this (v. fig. 960), you separate the two plasters with sand-bags, or with a metal rod, having at its ends semicircular terminals embracing the two plasters and capable of being lengthened more and more, like a shoemaker's measure.

To prevent flexion of the pelvis on the thighs, it is necessary to keep the trunk flat with a few turns of Velpeau bandage passing round the frame upon which the child sleeps.

This repeated effort will not be lost. It will develop the will and strengthen, in the long run, the extensor muscles of the thigh on the pelvis, so that one day, after a few weeks or a few months of these attempts which until then have been fruitless, the child becomes able to stand upright for a **few seconds**, without the help of his mother's hand, supported only by two crutches.

The progress is immense! To get so far that the child stands alone, without the help of anyone, with only his sticks or his crutches, or walking sticks, it is capital. That proves, not only that he has better muscles and more strength, but chiefly and above all, that his brain has acquired the **sense of equilibrium**, which is the first step towards success.

Until then, so long as he needed the help of some one to keep him upright, the child had no sense of equilibrium and the success remained uncertain; now it is assured.

In reality, one may distinguish, in this laborious apprenticeship in walking, four phases, of which each lasts several weeks or several months, according to the gravity of the case.

First phase. — After the redressment of the deviations, the child remains on his feet with the help of one or two persons, while *he is still without the sense of equilibrium*.

Second phase. — *He knows how to stand on his feet without the intelligent help of a stranger*, that is, with only the help of two sticks or two crutches; he therefore has the sense of equilibrium *whilst he is standing*, but he is not yet able to walk alone.

He is only able to walk with the help of one or two persons, for though he has the sense of equilibrium for standing upright, he has not yet acquired it for the more complex act of walking.

Third phase. — *He makes his first step quite alone, without intelligent help*, with the sole support of his sticks or his crutches.

Fourth phase. — After that, the battle is gained. *He will succeed in walking* either without support or with a walking stick only.

One, or even two years, are necessary to arrive at this result.

One word more on the apparatus for walking. One uses for

two or three months, a plaster reaching from the toes to the trochanter, then a celluloid apparatus, articulated (with play



Fig. 961. — Child of ten years, after treatment. He had never walked. Actually, after a year's attention, he is able to walk with a walking stick.

limited by half) at the foot and at the knee. This celluloid is

constructed on a mould taken by you. After having made the mould, you apply a new plaster for 15 or 20 days, which is the time taken to prepare a celluloid.

When you are in possession of the celluloid, you take it off several times a day, either to give baths, or to make massages of the muscles "of the convexity".

To strengthen these enfeebled muscles, one has recourse to active exercises carried out for a few minutes several times a day, either lying down or upright.

They consist in making the defaulting muscles work as much as possible, consequently making them raise the foot on the leg, to place the leg in extension on the thigh, and that in extension on the pelvis, and to carry the thighs into as great abduction as is possible.

After some weeks, one adds to this some passive movements, to bring back



Fig. 962 — Bertha P. of Courbevoie, after treatment. She had come to the Orthopœdic Institute at Berck at fifteen years of age (sent by my distinguished colleague and friend Dr. Ardouin). She had never walked. Her legs were bent on the thighs and the heels glued to the buttocks, kept in that position by an apparently invincible contracture; legs blue, almost black, trophic troubles. The contracture extended to the muscles of the trunk, but intelligence was preserved, let us say 3/4.

I had promised the parents to put the child on her feet and make her walk; but I demanded for this a year and a half of credit, and made the mother herself assist. In thirteen months the child (redressed in three sittings under chloroform) was on her feet and able to walk two or three hundred metres supported simply by a walking stick.

a supple condition to the joints which are stiff, little or much, owing to the malady and to immobilisation in the apparatus.

The movable apparatus will be preserved as long as the leg manifests a tendency to return to its bad position, that is, 6 months, 8 months, 12 months, this varying very much with the case.

Finally, one attends to the education, methodical and rhythmical, of walking. For still a long time, the child will drag the legs heavily¹ and knock the knees together in walking; but this ends by disappearing more or less completely, thanks to massage, gymnastics, to repeated active exercises.

**Exceptionally grave cases, where the muscles of the trunk
are included.**

The trunk weighs down the lower limbs of which the different segments are folded like an accordion. Even in these cases we are not disconcerted. We can succeed in making the child walk, with the help of two walking sticks, it is true, by means of an apparatus rising to the axillæ, an articulated apparatus with artificial muscles (v. Chap. xiii). But this is the business of the orthopædic mechanician; your part consists in redressing the multiple deviations existing, in taking a mould, and preserving the correction with a large plaster whilst the celluloid is being made.

Unless, everything considered, you do not wish to be troubled with these bad cases, happily exceptional, and pass them on to the specialists.

Conclusion. In short, if the practitioner will and can undertake the almost daily attention to these children, if he is well seconded by the parents, he will accomplish little miracles².

1. He will advance on the points of the feet, walking **digitigrade**.
2. Improvement, little or great, is produced in all these cases under the influence of treatment well carried out. But I only speak here of the **true, congenital Little's disease**, and not of the **acquired spasmodic paralysis**, which begins at from 7 to 15 (Dejérine), and which, contrary to precedent, is **aggravated** year by year, whatever may be done.

Again, the result depends upon the perseverance and faith of the practitioner, who knows or does not know, how to communicate his conviction and his perseverance to the parents. Some will know how to succeed in making such children walk sooner or later, others will never succeed.

There are also a good number of children of 8, 10 (fig. 961) and even 15 years (fig. 962), who have never walked, and whose deviations, helplessness and troubles of nutrition were so grave that it did not appear justifiable to treat them — and who, after the daily attention we have given them for six months, a year or two years, have been able to walk hundreds of metres at a stretch, and without support, or simply with the support of a walking stick.

The Surgical Treatment of Little's Disease.

In the grave cases, it is necessary to know how to associate with purely orthopædic measures, all the resources of surgical treatment. Professor Vulpius of Heidelberg, who has an especial knowledge of the subject, has been good enough to write the Chapter on surgical treatment, as he did the Chapter in Infantile Paralysis (Chap. x).

This is his account, word for word.

The methods described on p. 687 of the modern surgery of the tendons may be applied also to *spastic paralyses*, which we are going briefly to discuss by referring especially to cerebral infantile paralysis and Little's disease. You will find in those cases either spasms in certain muscles, especially in the flexors, or at the same time pareses in the antagonist muscles, a mixture of paralysis and cramps of different degrees.

The deformities resulting from these muscular contractions are quasi-typical. The foot is always found in the equine position, very pronounced, to which is often added varus and rarely valgus.

At the knee, we see a flexion more or less considerable; at the hip, flexion, adduction, and a certain degree of rotation inwards.

The spasms and contractures increase when the patient commences

to walk. It is a very grave and painful condition, especially in bilateral cases (Little's disease).

In cases of cerebral hemiplegia the same spasms in the arms are naturally found, and, consequently contractures, of which the position

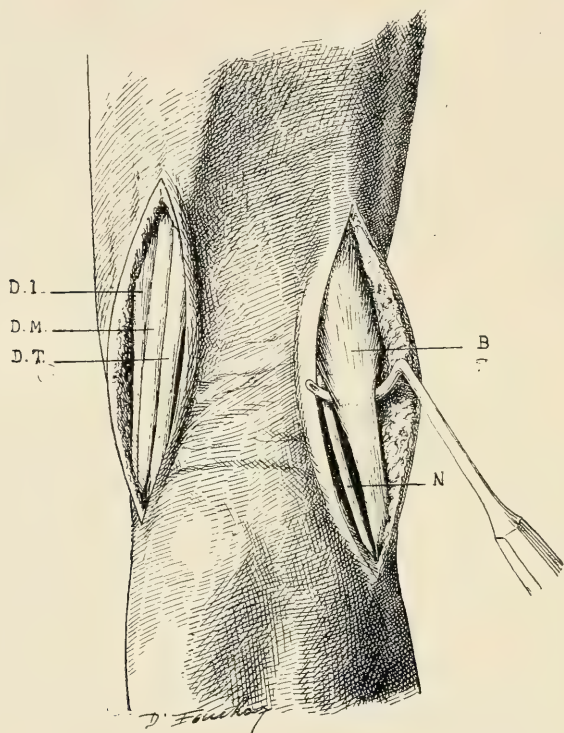


Fig. 963. — Tendectomy, 1st. stage : The tendons are laid bare and isolated from the subjacent tissues with an aneurism needle; the tendon is cut on the needle. B. Biceps; N. External popliteal nerve; D. T. Semi-tendinosus; D. M. Semi-membranosus; D. I. Gracilis.

of the fingers and of the wrist in flexion, of the thumb in flexion and extreme adduction, of the fore arm in flexion and especially in pronation, have a grave influence upon the function of the upper limb.

Complicated spasmodic movements of athetosis in the arms are also found in the grave varieties of Little's disease, which render the

condition of these patients serious and sad, when they are complicated, as they often are, with idiocy in varying degrees.

Let us speak of the operative therapy, and say at once that the grave cases of spastic paraplegia, combined with some affections of

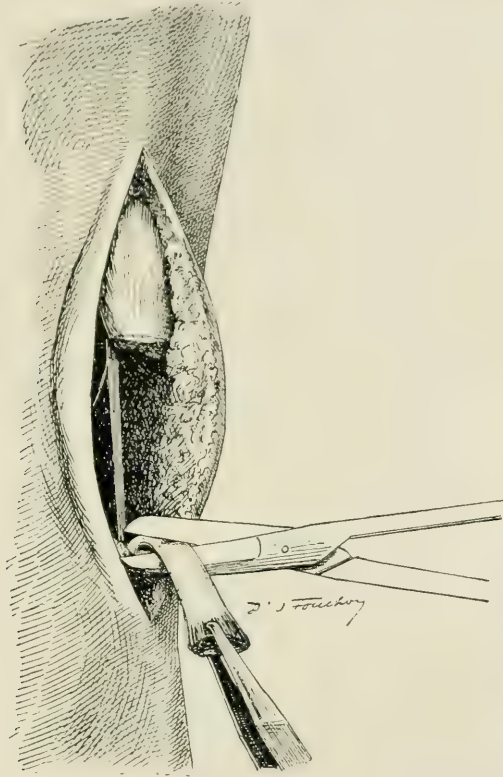


Fig. 964. — The peripheral end of the biceps is seized by the forceps and removed by a cut of the scissors.

the upper limbs and with marked idiocy, are not suitable for this treatment.

But do not be deceived by the stiffness of expression, by the strabismus, by the difficulty in speech, which often give the appearance of an idiocy more serious than it really is.

After what we have said, it is necessary to contend :

1st. Against the contraction of spastic muscles :

2nd. Against the spasm itself :

3rd. Against the paresis of certain muscles :

1st. The *contracture* may be got rid of by tenotomy. As to the

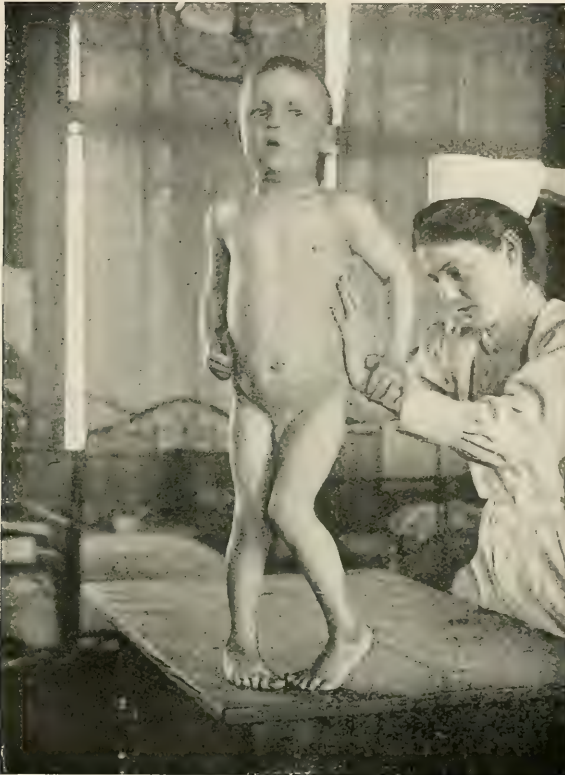


Fig. 965. — Little's disease (of medium gravity); doltish expression, thigh in flexion and abduction, legs flexed on thighs, feet in equino-varus.

equine spastic foot, I do not advise you to perform the simple linear tenotomy, because the muscular cramp which follows retracts the tendon and thus lengthens the separation in a way often unexpected.

Prefer the plastic elongation of which we spoke at the beginning (v. p. 677).

Perform tenotomy of the flexors of the ham by the open method;

because of the inevitable dangers of the sub-cutaneous method.

As the sheaths of the flexors have a great tendency to the reproduction of the tendons, and by that the danger of relapse being



Fig. 966. — The same after surgical operation.

imminent, add a *tendectomy*, that is, resect 1 or 2 cm. of the length of the tendon (fig. 963 and 964).

Perform, at the same time, tenotomy of the contracted flexors of the hip below the anterior iliac spine by the open method, whilst you can correct the contracture of the adductors by tenotomising them by the sub-cutaneous method.

After having operated upon the three great articulations of the limb, it is necessary for you to fix them in a well corrected position by means of a plaster apparatus, which should be very long if it is for a bilateral affection.

In order to reduce it as much as possible, you may leave the hips free, on assuring the abduction by means of a stretcher fixed from one leg to the other (fig. 960).

Commence the post-operative treatment by massage and gymnastics, after five or six weeks of fixation.

2nd. The *spasm* is diminished by the same means, which makes the contracture disappear, that is, by tenotomy. But it may not always disappear completely, and sometimes returns later on.

In such remittent cases, one may have recourse to tendon transplantation which acts more energetically against spasm than tenotomy.

3rd. The paresis of certain muscles is very often combined with hyper-innervation of the others, and requires tendon transplantation which corresponds then to several indications: weakening of the spastic muscles, strengthening of the paretic muscles, suppression of spasms. Employ the technique of grafting described above (v. p. 691, the surgical treatment of infantile paralysis).

The corresponding operations on the upper limb being more complicated, ought rather to remain in the dominion of the specialist, who may, however, obtain satisfactory results as to the position of the fingers, of the wrist and of the forearm (supination).

To sum up, we can prove that the modern operations on the tendons have brought about a very great progress in the treatment of spastic paralyses. But, however, the results are more incomplete than in infantile spinal paralysis and demand more patience (fig. 965 and 966).

SUPPURATED CERVICAL ADENITIS

(CONDITION ON ARRIVAL AT BERCK)



This young girl has been treated by our ordinary method of punctures and injections. The pus was yellowish-green (see pl. I, B); consequently we injected oil, creosote and iodoform. 8 punctures and 7 injections were thus made, at the rate of one every 6 days (about). — After the 8th puncture (without injection) compression of the region of the abscess.

See the result obtained (perfect cure) plate V.

THE SAME AS ON PLATE IV. — AFTER OUR TREATMENT

SUPPURATED ADENITIS. CURE WITHOUT CICATRIX



The same young girl as on plate IV. Here she is, 2 months after our treatment by punctures and injections (v. explanation of pl. IV). One may notice that the cure is perfect and without a shadow of a cicatrix.

CERVICAL ADENITIS

MISCHIEF CAUSED BY SURGICAL OPERATIONS

*Cliché J. Fouchou.*

An example of mutilation left (constantly) by surgical operation in the treatment of cervical adenitis. One can see here that the post-operative cicatrix starts at the mastoid process, follows the anterior border of the sterno-mastoid, passes below the hyoid bone and terminates on the right hand side : under the ear it is depressed and whitish ; then comes a slightly prominent keloid ; lower down the cicatrix is flat, but violet coloured. — Ineffaceable mutilation.

CERVICAL ADENITIS

(SAD RESULTS OF ABSTENTION)



Cliché G. Courtellemont.

Suppurated cervical adenitis. — Here nothing had been done, no operations, no injections. In this patient, *who had refused all treatments*, the glandular lesion has invaded the integuments which, at last, became ulcerated at four points : through these orifices appear fungous masses. — Practical conclusion : abstention from all treatments is, here, no more permissible than surgical operation. In such cases one must always have recourse to our treatment by punctures and injections.

FOURTH PART

APPENDIX

CHAPTER XVIII

A WORD ON THE TREATMENT OF CERVICAL ADENITIS

The cervical adenites are certainly less grave of themselves than through the unsightly stigmata which they too often leave behind them, stigmata to which the world attaches such a grievous significance. « Every cicatrix on the neck hopelessly disqualifies a woman¹. »

The objective of practitioners ought to be, consequently, to do all they can to avoid cicatrices.

Instead of that, how many surgeons are there still — nearly all — practising extirpation at the outset, which, when it has cured (?) (for it is far from curing always, and how many recurrences do we not see after operation!), inevitably leaves indelible scars behind! (See fig. 967 to 972.)

It is against this method of operating that I set myself, admitting that it was also mine at the commencement of my practice.

Is it possible to do better, and obtain a cure without leaving any traces? — Yes, certainly, in this way :

a. **Spontaneous resolution** is not rare. Therefore do not hasten to interfere.

b. If the gland instead of being absorbed, **softens**, you treat it like a cold abscess in the limbs, by punctures and injections: the cure will be equally perfect.

1. Berger, Surgical Congress 1901, p. 723.

CATOR. — Indispensable orthopedics.

c. If the **indurated gland** remains indefinitely **stationary**



Fig. 967. — Frightful mutilations left by three surgical operations. Compare with this the complete cures which our method affords (v. fig. 976 and 976 bis).

(a more rare case), promote artificially either its resolution or

its softening, but always by methods which safeguard the integrity of the skin.

Interfere by surgical operation only when the skin is already



Fig. 968. — Another example of the evils caused by surgical operation in the treatment of adenites. This young girl was operated upon six times.

very widely ulcerated, and when there is, even from the æsthetic point of view, a manifest advantage in doing so, *which will scarcely ever be the case.*

This disposed of, we will enter into the details of the technique to follow in each particular case. One may distinguish

three varieties : 1st. suppurated adenitis, not opened : 2nd. indurated adenitis : 3rd. fistulous adenitis.



Fig. 969. — The same young girl as in the preceding figure.

TECHNIQUE OF THE LOCAL TREATMENT ¹

1st. VARIETY. — THE ADENITIS IS SOFTENED, BUT NOT OPENED

It is the variety most easy to treat.

Take notice that most surgeons recommend operating upon

1. See the thesis by Dr. Loze, of Berck, 1905.

indurated adenites, for fear that they may become softened: but that is precisely what is wished.



Fig. 970. — Irregular cicatrices, resulting from the incision of softened tuberculous glands.

One finds oneself then in the presence of a cold abscess. There is no more difficulty in curing it here, by punctures and

modifying injections, than in any other region of the body (fig. 973).



Fig. 971. — Keloids resulting from simple opening and scraping tuberculous glands.

Why then does some surgeon, who treats elsewhere tubercular collections by punctures, believe that he ought to have recourse here to the bistoury and to extirpation? One may

understand better an opposite course, seeing that the question of the visible cicatrix is of importance only in the region of the neck.



Fig. 972. — A proof that extirpation does not always cure; after one first extirpation which has left a prominent cicatrix, a recurrence has been produced at two points, of which one has already opened spontaneously.

You will, then, treat softened adenites by punctures made with a needle, number 3 or number 4, and by the modifying injections. Choose the liquid which you know the best, creosoted oil or camphorated naphthol with glycerine, follow

the technique indicated in p. 128, and you will always arrive at, that is (leaving chance on one side) 99 times in 100, a perfect cure, without accident or cicatrix.

And still some members of the medical world can be found who say or write « that no serious advantage can be obtained from injections in such a case » (!)...

That is not to be wondered at. I myself, used such lan-



Fig. 973. — 1st. variety; soft adenitis, suppurated; one punctures as one would for cold abscess.

guage twelve or fifteen years ago, when I did not know of all the resources of the method of punctures, when I had not yet learned of what use this weapon would be to me when delicately handled.

If the treatment is delicate, do not however exaggerate its difficulties : — 9 times out of 10 you will not find any, and the cure will be made very regularly, without accident : once in ten there may arise certain accidents as in the treatment of any cold abscess (v. p. 148). I am going to refer briefly to them (fig. 974 and 975).

CERVICAL ADENITIS

(EVEN IN CASE OF FISTULA, **DO NOT OPERATE**)*Lucie J. Fourchon.*

On her arrival at Berck this patient presented a fistula measuring 8 mm. in length and 4 in width, slightly below the mastoid process, one finger's breadth behind the lobe of the ear.— Treatment by our injections. The cure is so perfect that, now, one imagines more than one sees the place where the fistula was. — A surgical operation would never have left so little trace and given such a result.

a. If the skin is already a little altered in its colouration or its resistance when the patient comes before you, you will take precautions to save and strengthen it.



Fig. 974. — If the skin is already altered at one point, make the puncture some distance away, in the sound skin.

b. If it is the tension of the wall which constitutes the danger, you will empty the cavity by puncture one or several times without injection. As soon as the skin has become stronger, you will commence the injections.

c. If the danger consists in an invasion, already quite evident, of the deep surface of the skin by tuberculous fungosi-

ties, it is necessary to inject the cavity with a few drops of camphorated naphthol, to destroy those fungosities and detach them from the wall or to attenuate gradually their virulence; but



Fig. 97⁵. — After puncture, one does not make an injection, but compresses the abscess by means of two tampons crossed.

taking care to make frequent evacuations of the liquid produced by the « irritative » action of the naphthol, and preventing all pressure over the already unresisting skin.

It has happened to me to make, for these difficult cases, two or three punctures in the twenty four hours, for several days, and to save the skin in this way, that is, to arrive at cure

without cicatrix¹ in patients whom very

1. I speak here of bacillary adenitis pure, and not of acute adenitis of the cervical region, which ought to be opened. But, there again, try to prevent any trace being left. — Instead, then, of opening with the bistoury, rely entirely for that upon our needle N° 4 for punctures (see p. 118).

The pus flows by the small track, which will be reopened the next day with a blunt probe, or even with the same needle N° 4. In a few days cure is accomplished and nearly always without apparent cicatrix.

I have been observing a very fine example with my distinguished colleague Dr. Pescher, at Paris. — We have been able in this way to avoid a cicatrix in a young girl attacked by phlegmonous adenitis of the neck, which other surgeons had judged to be suitable only for a large incision, with drainage. The opening with the needle N° 4 has given a cure in 15 days, without any mark being visible.

It is for these collections, more or less clearly acute, that the ancient seton did good. But why do we not keep to one



Fig. 976. — Suppurated adenitis. Condition on arrival at Berck.



Fig. 976 bis. — The same, after two months' treatment by our method.

clever surgeons had declared curable only by a large extirpation.

It is especially in cases of this nature that practitioners will never agree on the course to follow; as long as, at least, some will know and others will not know, how to cure these "cases on the boundary line" by solely conservative methods.

Here are two observations very suggestive from this point of view.

1st. example. Some time ago, a professor of the Faculty of Paris sent me a child in this condition. He had said to the parents: Go at once to Berck, where they will perhaps cure your child without incision.

If you are not able to go immediately, come again to-morrow, I will make an incision and perform curettage.

The child came the same day to Berck, and was cured in six weeks, without an incision and without cicatrix.

2nd. example. I saw, in June 1905, a tall and beautiful young lady of twenty one years, Mlle H. of Paris, with a suppurated adenitis as large as the fist, extending from the right ear to the hyoid bone.

She had already consulted three very able surgeons, who had been unanimous in recommending immediate extirpation, with dissection of the wall of this vast collection.

The mother having spoken to the surgeons of the treatment by puncture and injections, one of them declared that, in this particular case, it were folly to think of it, which was moreover easy for him to say who had never taken any part against the treatment and indeed, very often employed it. "*But*", he insisted, "*in the case of your daughter, it will do her no good*" and he added, "I am ready to affirm it in writing."

He wrote it, in fact.

And then the mother came to see me the next day, with this opinion signed by one of the greatest names in surgery in Paris.

only of the orifices of the seton instead of making two? On the other hand, in the true bacillary adenites, those of which I speak, do not trust to the seton which will never give you a cure, any more than a simple incision is able, scarcely ever, to cure a cold abscess in any other part of the body — remember moreover that the seton exposes a little to an infection of the tuberculous focus.

Let us add that there are **mixed, bacillo-septic** adenites, in which one is not always able to prevent a small cicatrix (I have said why in p. 159). — At least, it is necessary always to fight against it.

I examined the young lady with the family doctor. The collection in the neck was enormous, was threatening to break through the skin, already raised at one point, in the shape of a little mamelon, and very thin.

I undertook, nevertheless, to set about the treatment by my usual method, promising a cure without leaving any trace. Two punctures, without injections, were made that day and the next. On the fifth day, I made a first injection of camphorated naphthol with glycerine. There were yet ten punctures or injections made, at two or three days interval between them.

At the seventh week, the cure was complete, without cicatrices.

These two observations will help you to remember that there is no suppurated cervical adenitis, however *voluminous* or *advanced*, which ought not to yield¹ to our ordinary treatment of punctures and injections, that is, be cured without cicatrix, and the great master who had affirmed to the contrary, with so much "authority", did not know all that can be attained by punctures and injections.

2nd VARIETY. — ADENITIS COMING TO YOU AT THE PERIOD OF INDURATION

Above all do not, after the example of so many surgeons, hasten to extirpate. Why inflict at once on your patient, with a light heart, an unsightly cicatrix for life?

There is no other rational course here than one of the *two* following : either to do nothing, to *wait* for the resolution of the softening spontaneously : or else to *promote* it.

First method : If the patient is not pressed for time, wait, and make him wait (fig. 977).

1. It is always necessary, under similar circumstances, to search in the mouth for a bad tooth, in which case the condition of the cure, certain and definite, is the suppression of this source of infection.

A bad tooth, whether stopped or not, is capable of hindering the cure, or, at least, producing a recurrence.

How many times, in the presence of a treatment by injections which did not succeed in the normal lapse of time, have I not had stopped teeth taken out, which the dentist has assured me "could no longer be a cause of infection"!

"Take them out all the same", I reply, and the so-called "innocent" tooth, being removed, I have seen the purulent collection dry up almost immediately.

a. Either adenitis will be **cured spontaneously**, and spontaneous resolution has been observed by each of us again and again, perhaps favoured by a general tonic treatment, sojourn by the sea, and also by local treatment. This consists especially in an aseptic toilette carefully made, of the mouth and all the



Fig. 977. — Small hard adenitis the size of a nut. Expectant treatment, sojourn by the sea. One waited the spontaneous re-absorption.

tributary territories of the cervical glands, — in the sacrifice of all bad teeth or those strongly suspected, in the eradication of adenoid vegetations, in the treatment of the ears, of the nose, or of the scalp, if the glandular infection comes from any of those different points.

b. Or, the adenitis **will soften** of itself, which is also a mode of cure without cicatrices, seeing that we return here to

the first case, previously considered. You will recommend your patient to await the time when this softening will be produced — he will recognise it by the tension and thinning of the skin and by its darker colour — and to come to see you immediately, before the skin may be altered. If you have warned him, he will not fail to do so, because you have promised him that, by punctures and injections, you will know how to cure it rapidly and without a blemish. “at the psychological moment, when the spontaneous softening of his gland is produced”.

Second method. — You have waited long enough — twelve months, fifteen months, twenty months — and you have come to the moral conviction that the adenitis **will not budge at all**¹.

1. But, you are going to ask me, is there not, then, any balneotherapeutic treatment at any station whatever, or any internal medicinal treatment, which would be able to resolve or soften the cervical glands?

I do not know of any. And still I can state that I have tried everything, as well as all stations of repute and all internal treatment extolled in the books on medicine.

I do not say that all those treatments are absolutely without effect, I say only that they are uncertain, that there remain too many stubborn adenites, unwilling to soften or to be re-absorbed either by baths or the most reputed medicines, or by radiography, which, however, in a few cases has been able to hasten resorption or softening of the cervical adenitis.

Accessory treatment by Radiotherapy.

Note by my assistant, Dr. Fouchou.

What value has radiotherapy in the treatment of adenitis?

It has given certain results, but nothing precise or very constant. However, it may be said, in a general way, that, if the adenitis tends to re-absorb, radiotherapy appears to hasten the softening process and mature the abscess.

It is then an adjuvant for us in the action of the injections; we combine very often the treatments. It is very difficult to give any precise rules for the employment of radiotherapy in the treatment of tuberculous adenitis. The apparatus for measurement are not yet very accurate (Roederer).

In any case, one is in general agreement as to not exceeding the limits fixed by the rule of Becière, which is, to cause to be absorbed, at each sitting, the quantity of rays compatible with the integrity of the skin.

This is the practice we have adopted, and which, combined with marine

or again, **if they insist**, you are laid under the necessity of interfering in one way or another.

In these cases, which are, fortunately, the exception, one ought not, any more than in the others, to extirpate the gland.



Fig. 978. — Bulky adenitis with the aspect of lymphadenoma, treated by X rays and sojourn at Berck.

treatment, has given us, in certain cases (fig. 978 and 979) excellent results.

Instruments. — Rochefort transformer of 45 cm. spark, with condenser and trembler.

Chabaud ampoule with osmo-regulator,

Villard's valve.

Continuous current; 110 volts at the primary.

Beclère's Sparkmeter.

Sabouraud's Radiometer.

Drault's Localiser.

It may be that the patient, in spite of all that you have said to him, begs for extirpation, and may wish to force you to do it.



Fig. 979. — The same after six months of purely conservative treatment. In place of five large glandular masses, there remains only a small gland scarcely visible (which in its turn completely disappeared four months later, ten months after the commencement of the treatment).

Method of Operating. — The ampoule is regulated by means of the osmo-regulator, in such a way as to give a spark of about 3 cm.; it is placed at a distance of 10 cm.

Localisation. — The localisator of which we dispose permits of the easy limitation of the zone of irradiation, but it is not indispensable. A very simple procedure consists in making, over the region, a negative mould, in plaster. — one protects the parts to be moulded with a layer of cotton wool of 1 cm. in thickness, regularly spread, and one lays over all some squares of plaster tarlatan (v. p. 97 — the method of taking a mould) exceeding considerably the limits of the affected zone. For cervical adenites, the mould ought to cover

Reason with him¹, shew him that there is only one rational treatment which is to excite artificially the resolution or the softening, which are both methods of cure without cicatrix.

You know already how to secure it. We have seen, in Chap. III, p. 164, the technique of the injections in dry and

fungous tuberculoses. It is a singular thing, the same agent (naphtol camphor) can, according to the case, and especially according to the number of the injections, produce resolution or softening.

a. *The method of procuring the hardening and re-absorption of the gland.* — If for example, one injects only from $\frac{1}{4}$ to 6 drops of naphtol camphor, and only on every three or four days, until there have been ten injections, one promotes the hardening instead of causing softening, but the sclerosis is not produced immediately, nor



Fig. 980. — One may soften an adenitis by injecting into the centre of the gland a few drops of camphorated naphtol.

even during the period of the injections. On the contrary, **the**

entirely the corresponding half of the head and to descend to the middle part of the thorax, taking in the stump of the shoulder. Furnished with lead leaf on both faces, pierced with openings opposite the affected glands, the negative constitutes a very satisfactory localisator.

Number of sittings. — We give a first series of three sittings (one per day, for three consecutive days) in such a way that we obtain, at the end of the third, the maximum tint indicated by the apparatus of Sabouraud and Noiré. After each sitting, the pastille indicator is carefully put aside and kept in the dark until the following seance. *After the third seance, rest for one week.*

The treatment is continued afterwards at the rate of one sitting per week : each of these sittings lasts from eight to twelve minutes, interrupted a little before the Sabouraud pastille has reached the standard tint.

1. Unless one is treating a person to whom the question of a visible cicatrix is of slight importance, for instance an adult labourer.

gland swells during that period. It is only 3 or 4 weeks, after the tenth and last injection, that the gland begins to diminish in volume, and it is only four or six months after the cessation of the injections that one observes the complete, or nearly complete, disappearance of the glandular tumour¹.

b. *Method of obtaining softening of the gland* (fig. 980 and 981). — If one injects from 10 to 20 drops of naphtol camphor every day, one will have, on the fourth or sixth day, in the centre of the gland, a sensation of elasticity or even of distinct fluctuation. It indicates that the softening sought for has been produced.

I repeat that it is better to look for softening than for sclerosis. Softening permits one to obtain, with punctures, more complete and more perfect cures.

Beginning from the time when softening is obtained, it is evident that the case becomes one of ordinary cold abscess.

If indurated points remain, you will follow them up with new injections of naphtol camphor, without your being possessed with the idea of softening at any price, so long as there are the smallest vestiges remaining; you may ignore the debris, which will disappear completely in the long run, or nearly completely, by progressive hardening.

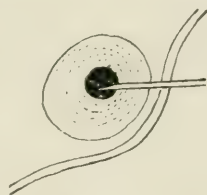


Fig. 981. — The liquid finds or creates in the centre a cavity which enlarges little by little, by successive softening of the various layers of the parenchyma of the gland.

3rd. VARIETY. — OPEN OR FISTULOUS ADENITES

The patient arrives with ulceration already produced. Well, even in that case, one generally gains, from the æsthetic point of view, by having recourse to conservative measures rather than a surgical operation (v. fig. 982 to 984).

The conservative measures are Vigo plasters, powders, slight

1. One may also obtain hardening by injecting into the gland, instead of naphtol camphor, oil, creosote and iodoform (see p. 165).

applications of nitrate of silver pencil, radiotherapy and some prudent modifying injections (made every 3 or 4 days with



Fig. 982. — If, in spite of everything, the skin gives way in the course of treatment, or, if the patient comes with an open adenitis, the slight conservative measures are of still more value than extirpation; one sees in the pointed lines the limits of the incisions which one would be obliged to make to perform extirpation (compare with fig. 984).

4 or 5 drops of liquid). The cure is as last obtained in this way — provided the circumstances are good.

THE TREATMENT OF MARKS ON THE NECK

As to the treatment of cicatrices left by surgical operations, you should know that it is practically nil.



Fig. 983. — Cicatrix which would be produced by such an intervention, whilst, if one does not operate upon it, there will remain only two small points, almost invisible.

However, you will find many treatments described: radiotherapy, local massage, injections of paraffin, surgical extirpation

of the cicatrix in order to find a new cicatrix less unsightly, I have tried them all; but I have generally obtained only unsatisfactory results.

You may try them also, but I advise you not to promise great



Fig. 984. — The skin of this young girl, already blue on arrival had, in spite of all precautions, broken down in the course of treatment; the cicatrix of the wound, treated by slight measures, is scarcely visible. (Compare with the cicatrix in fig. 982 and 983).

things, and to mistrust above all the great operations, so-called æsthetic, for it will frequently happen that, in trying to efface the mark, you will aggravate it; and you will see another keloid more extensive succeeding to the small keloid cicatrix extirpated; that is to say that, when the mischief is done, it is often too late to remedy it, and women thus disfigured will seek

vainly all their lives to repair the irreparable outrage of the surgeon.

Conclusion.

Fortunately, a cicatrix on the neck is infinitely more easy to avoid than to obliterate.



Fig. 985. — Fistulous cervical adenitis. Some glands have been opened (B and C). Other glands (A) are softened but not opened. One makes at A injections and punctures; at B injections at the points b; at C, flat dressing, with slight cauterisations.

One can always avoid it, or almost always, with the therapeutics which I have described. The treatment demands without doubt, a minuteness, an effort, a perseverance, and especially an expenditure of time, much greater than **surgical extirpation**, however rapid and brilliant : but extirpation **leaves an indelible mark, whilst our treatment cures without leaving traces.**

To cure adenites without leaving traces is a result so good, it seems to me, that practitioners should take a little trouble to obtain it.

APPENDIX TO CHAPTER XVIII

An observation on Cervical Adenitis (fig. 986 to 987 bis.)

The remarks which follow are interesting and instructive in more than one way. It shews in the first place, that very extensive extirpation of adenites does not protect against a recurrence.

The patient, Charles G., 19 years old, had been operated upon once,

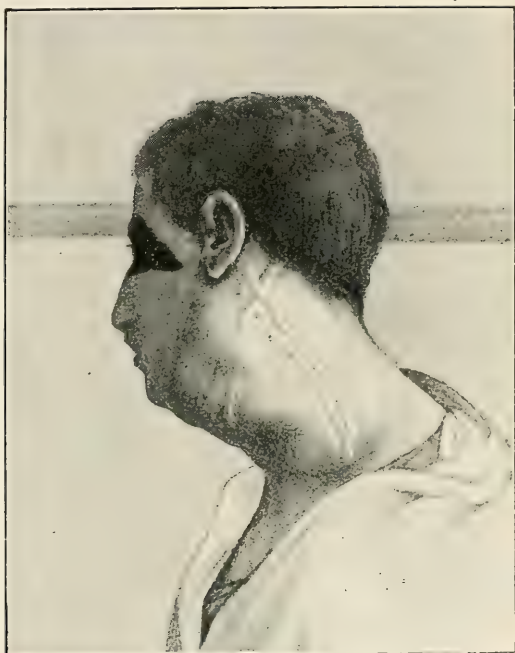


Fig. 986. — Charles G., aged 19 years, had a left cervical adenitis. Here is the sad result left after four operations; the neck is fearfully scarred for life and the adenitis has recurred to a greater extent than before operation.

for a small cervical adenitis, in Berlin, four years ago, by perhaps the most able of German surgeons, very completely and very well. It did not prevent his malady recurring.

He was operated upon a second time : a new recurrence.

He left then for Switzerland, where a third operation was performed : a third recurrence; then a fourth operation, and a fourth recurrence. The more they operated, the more it grew again, and each

new intervention only gave new life to the tuberculous lesion.

Here is the patient (fig. 986), after the fourth operation, on his arrival at Berck, presenting an enormous tumour which gave him, in truth, much more the appearance of a person with lymphadenoma than with a tuberculous polyadenitis.



Fig. 986 bis. — The same — a year later, after having followed our treatment by injection. — Complete cure (without a new cicatrix).

It is no longer only the left side which is affected. After the last intervention, the right side — until now free — is attacked in turn! (V. fig. 987.)

And to think that they wished to operate again! This time the patient was no longer agreeable to this at any price.

A little afterwards he arrived at Berck.

And now look at him (fig. 986 bis), a year later (after he had followed our treatment by softening injections, the technique of which you know, see p. 964).

We attacked this great polyglandular tumefaction (and it is thus that it will be necessary for you to proceed in similar cases), by islets, by successive quarters.

The treatment of each lobe occupied four weeks. After which, there were three or four weeks rest, so that the treatment of the entire tumour occupied from six to seven months.

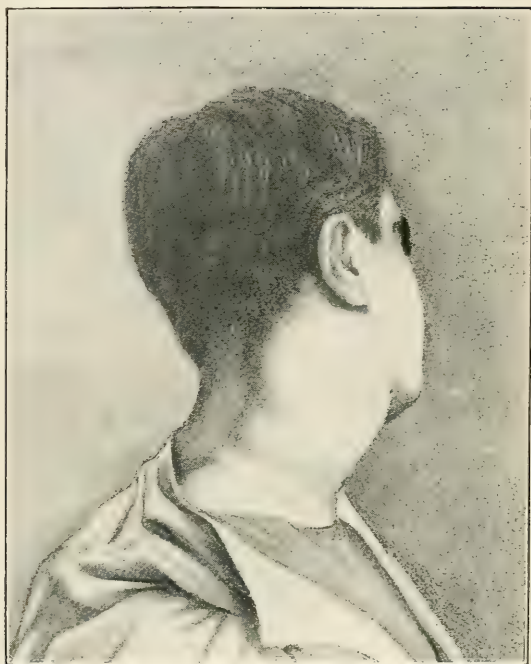


Fig. 987. — The same; seen on the right side — on his arrival at Berck. An adenitis on the right side had appeared, following the fourth operation performed on the left side).

One can see that the result is complete. This obstinate and grave polyadenitis has been perfectly cured (fig. 986 *bis*).

Here is now the right side of the same patient on his arrival at Berck (fig. 987).

This second side has been treated and cured like the first, but much more easily and much more quickly, in two months and a half.

On the right side one does not see anything of the cicatrix; this right side, very fortunately, had not been operated upon, whilst on

the left side one perceives the traces (alas, ineffaceable) of the four operations which the patient had undergone elsewhere.

Lastly, these remarks teach us another lesson: namely, that it is not absolutely necessary in order to obtain the solution of a hard adenitis, that it should have at its centre, a trace of caseation, nor the commencement of a cavity.



Fig. 987 bis. — The same on the right side, fortunately not yet operated upon. Here he is, after one year of our treatment by injections. — Cure perfect and without cicatrix.

Without doubt this condition, when it exists, is very favourable and facilitates much the complete liquefaction of the gland under the action of our softening liquids. But the condition is not absolutely indispensable.

There was here no trace of a cavity, no commencing caseation, and nevertheless, the cure has been obtained quite completely.

It is true, you will say, that he had, to assist his cure by the injections, the precious advantage of a sojourn at Berck. Yes, without doubt, but when he submitted to the two last operations, the patient had also passed already a year in Switzerland, which had not prevented the recurrence.

CHAPTER XIX

THE OTHER¹ EXTERNAL TUBERCULOSES

A. *Cold Abscesses*. — B. *Tuberculous Osteites*. — C. *Fungous Synovites*. — D. *Spina Ventosa*. — E. *Tuberculosis of the Testicle and of the Epididymis*. — F. *Tuberculosis of the Skin and Tuberculous Lupus*.

A. — COLD ABSCESS

I. — *Diagnosis of a Cold Abscess. Utility of Exploratory Puncture for this Diagnosis.*

It may present itself in two different varieties :

1st. variety. — *Some one comes to consult you for a large swelling* which has been produced and developed without fever or appreciable pain (or scarcely any), and which is of doubtful consistence, really difficult to decide upon : resilience or fluctuation? mass solid or liquid? One does not know exactly.

Then again, if it is liquid, is it a question of a cold abscess?

I do not wish to study this diagnosis to the bottom, of which the elements are found (more or less scattered, it is true) in all the books, but refer you only to the great resource, which is *exploratory puncture for all doubtful cases*. No, not for all the cases (I am mistaken), because there remains one where you will never be allowed to have recourse to puncture to establish a diagnosis, it is the case of a possible hernia, that is to say, of a small swelling in the inguinal or crural region. The puncture of a hernia (!) would be disastrous. It is necessary for you then, in such a case, to arrive at a diagnosis without

1. That is to say, other than cervical adenitis, of which we have spoken, and other than the three great tuberculoses (Pott's disease, coxitis, white swelling) studied in the first part of this book.

puncture. It is generally easy, but not always : I know of several instances of these mischievous errors in diagnosis. That is why it is my duty to point them out to you :

The means of distinguishing a cold abscess from a hernia.

To avoid error, the first point is to remember the possibility of this error, of the confusion sometimes arising between a hernia and an abscess. Having thought of it, one finds, on looking well, the differences in their objective signs, and especially in their mode of reduction and reproduction, in the history, in the concomitant phenomena, and in the indications given by an examination of the neighbouring regions.

Common or analogous characters of abscess and hernia (likely to lead to confusion).

Their seat : in the inguinal or crural region (or more rarely in the lumbar region, in the triangle of J. L. Petit).

Their reducibility : both are effaced (more or less completely, under the pressure of the hand. Both change their volume from time to time, according as the patient is recumbent or upright ; both respond to the impulse of coughing.

Percussion ? — One might be deceived by this.

Either there is a slight dullness : but a small hernial protrusion, surrounded by dull tissues, especially if it is situated below the crural arch, *may seem* to give slight dulness or even absolute dulness.

Or, there is “ a slight resonance ”. But, a small portion of an abscess, pointing, seated above the arch and surrounded by a coil of intestine, *may seem* rather resonant to percussion.

Consistence ? — Indefinite. Is there fluctuation or resilience ? The distinction is not always easy to make.

Those are the causes of error.

These are the elements of the diagnosis :

Differential characters of Abscess and Hernia.

a) **For hernia.** — *Careful palpation* allows one to decide that the tumour is elastic, resilient and supple as a balloon, and does not give the sensation of fluid. Gentle and repeated *percussion* enables one to say that the tumour is resonant and not dull.

Impulses of cough and of straining are transmitted here *very directly*, with an absolute distinctness.

Reduction is obtained under a certain pressure. It is obtained completely, it is obtained more or less brusquely, it is obtained with gurgling.

The tumour only reappears if the patient coughs or makes an

effort. It reappears with a gurgle which is perceptible if one places one's finger upon the region when the patient is made to cough.

When the tumour has disappeared, one may place one's finger into a track or a free orifice.

And if one keeps one's finger there while the patient coughs, the finger experiences at once the impulse of the cough.

The examination of all the adjacent organs (bones, articulations) capable of producing an abscess by gravitation is entirely negative.

b) On the contrary, for abscess:

Careful palpation gives a sensation of fluid, and not of resilience or elasticity.

Careful percussion, gentle and repeated, always reveals a slight dulness, which one can make evident if one percusses alternately this point and the middle part of the abdomen.

The transmission of the *impulse* of the cough is not absolutely direct; as it is, for instance, over the middle part of the abdomen.

If there is *reducibility* under pressure, it must be noted at once that the phenomenon is produced without any gurgle. And then it is not real reducibility. The tumour is depressible and can be "pushed" back, rather than is reducible. One feels, under the pressure of the hand, the tumour diminish slightly — but it does not disappear completely, all at once, brusquely. When one presses it no longer, the swelling reappears, at least partly, without any effort having been made, without any impulse from coughing; it reappears without any gurgle.

In the case of hernia, the tumour ceases to exist when it is reduced. One may look for it in the neighbouring points, one does not find it; here, on the contrary, it still exists, it is simply lodged elsewhere. On looking well, one is able to find it in a neighbouring part, and one finds it, in fact, in the form of a distinctly fluctuating mass. If one presses on the opposite extremity (of the mass) one pushes it outside, one sees it swell out again, in part. If, then, one puts one's hand over the external sac whilst the other hand remains over the deep sac one may convey the sensation of fluid from one hand to the other (v. fig. 119 and 120, p. 137).

As also, nearly always in this case, it is a question of abscess of gravitation — **symptomatic** of a lesion of the spine or of the pelvis — one finds a history of pain more or less of long standing, experienced by the patient, and mistaken, quite often, for lumbago or rheumatism or sciatica. One finds, also nearly always, on looking carefully, direct signs on the side of the bones, namely a prominence, or a sensibility to pressure over the vertebræ, the joints, the iliac bones or the hip.

Finally, if you have radiography at your disposal, it will generally give you, in the case of abscess, an appreciable shadow, indicating the existence of this abscess (with its form and its direction, often along the psoas muscle) whilst radiography is negative in the case of hernia.

Here, then, are more signs than are necessary for you to make the diagnosis between cold abscess and hernia — in the sole case, I repeat, where you may not be able to call to your help the exploratory puncture.

In all other cases, when you are still in doubt as to the existence of an abscess, make use of puncture.

2nd eventuality. — Neither the patient, nor the parents, mention any swelling; it is for you to think of it, for you to look for an abscess, because you are treating the patient for a tuberculous lesion (Pott's disease, coxitis, etc.), which is very apt to cause an abscess by gravitation. You will look, then, for a probable abscess, you will look systematically at each visit — by careful palpation of the affected region, palpation which you will extend to the neighbouring regions, for there are migratory abscesses, more or less aberrant.

Thus you will trace “wandering abscesses” or “abscesses by gravitation” — because you have looked for them — since one generally finds only what one has sought for.

Supposing that you have found, close to a certainly tuberculous focus in a bone or joint, an abnormal swelling, a puffiness more or less circumscribed. Doubtless it may only be a tuberculous swelling, but is it an abscess already formed or only one in process of forming? for abscess is only, in a way, the third stage of the tuberculous new formation which, in its first stage, consists of solid fungosities, and in the second of caseous matter not yet liquified.

Well, palpation generally allows one to make the diagnosis. In the first stage (that of fungosities) one finds an elastic resiliency; in the second stage (that of caseous matter) a consistence of paste or mastic; in the third (that of abscess) true fluctuation.

If the sensation is not very distinct, if there remains some doubt, have resort here to exploratory puncture — which may give you pus in some case where palpation has not given you fluctuation. For instance, in the case of an abscess bound down or flattened against a bone by an aponeurosis or firm capsule. One has here no sensation of fluid, but only a sensation of resiliency, sometimes only of wooden hardness. Doubtless, in this case, a large clinical experience enables one to suspect the very probable existence of an abscess, but only exploratory puncture will enable one to **affirm it**.

Exploratory Puncture.

An exploratory puncture is harmless, provided that it is made with all the aseptic precautions already indicated for ordinary puncture (v. Chap. III).

For exploratory puncture, one provides oneself with the n° 3 needle and our aspirator, not the small Pravaz syringe, which, the needle being too small, will not allow of the passage of the liquid.

It is the same in abscesses of which the contents are very thick which necessitate the use of the n° 4 needle, but one ought to commence with n° 3 and not use n° 4 unless the result with n° 3 is negative.

One commences by making sure that the needle is permeable and that the aspirator has been emptied.

The prick. — At a few centimetres outside the cutaneous zone of the swelling, you prick the **skin** directly, with one sharp push, then you push the needle gently, following an oblique track in the direction of the tumour, until you experience the sensation of entering the main swelling. Already, from this moment, you are informed of its nature, whether solid or liquid, by the sensation you experience.

If the tumour is solid, the needle has difficulty in penetrating it, and its point then is embedded. If it is liquid, the point penetrates easily and moves freely about.

Often, before any aspiration, one sees immediately a flow of serum or pus coming through the needle. You have learned something; it is useless to push your search further, useless to attach the aspirator to the needle — unless you wish to profit by the occasion to make, at once, the first puncture and the first injection into the abscess.

If nothing escapes, or only a drop of blood, one need not conclude that there is no abscess, before having made an aspiration.

You therefore adapt to the needle the aspirator previously prepared (in which a vacuum has been made) and you turn the cock.

Then three things may happen.

Pus may come, or blood, or there may be nothing.

The interpretation of the result of exploratory puncture.

It seems, *a priori*, that nothing could be more easy than to interpret the results given by an exploratory puncture and that everything will be reduced to this : should pus come, there is an abscess; should it not, there is no abscess.

Alas! undeceive yourself! It is not so easy as that in clinical work, at least very often; the causes of error are numerous.

We have seen, at our vacation courses, well informed practitioners who have only succeeded in making negative punctures, or who have only withdrawn blood, in cases of very manifest abscess.

Why?

That is what it is necessary for us to explain. To be really useful, we shall be obliged to enter into very minute details, perhaps a little long, perhaps a little fatiguing to read, but which are indispensable to know well, if one wishes to avoid very mischievous errors.

1st. Pus or serosity is withdrawn.

Evidently, if it is *pus*, it comes from a cold abscess. If it has been formed without fever, or only with very slight fever up to about 38°, and almost without pain, the diagnosis is made.

If there is a *serosity* containing clots it is again a cold abscess.

It is still an abscess, if *serum* without clots escapes (something similar to the fluid of a hydrocele or of hydrarthrititis).

Even when the liquid has all the appearance of a *cystic* fluid, it may be a cold abscess, generally chronic. The diagnosis is made then from the concomitant symptoms.

When the aspirator withdraws nothing, do not conclude all at once that there is no abscess. Before affirming there is none, make sure that the extremity of the needle is really in the swelling, and not on this side or on that; then remove the needle to see that it is not blocked, which is often the case, by the debris of a fungosity or by caseous matter (in the last case, in spite of the fact that no liquid has come, it is still an abscess which may not yet be matured). One will not mistake for caseous matter small globules of fatty debris which sometimes block up the needle, especially in stout people, and are derived either from the tumour itself, which is a lipoma, or from the sub-cutaneous panniculus adiposus.

2nd. Blood is withdrawn.

It is most often a neoplasm, but it still may be a cold abscess.

If it is *one drop*, or only a *few drops* of blood, that may as easily proceed from a mass of tuberculous fungosities as from a neoplasm.

If a certain quantity of blood flows (for instance, a tea-spoonful or more of red or bluish blood) it is nearly always a neoplasm. However, here again, it might possibly be a question of an abscess, for the puncture of an abscess produces blood when one runs against a venule or an arteriole in the interstitial tissues, or in the wall of an abscess, but then, nearly always, there will soon be mixed with the

blood some drops of pus, which will enable us to make the diagnosis (see, in Chap. III, the incidents of puncture).

When not even a drop of pus appears, when there is only blood, one may make the diagnosis from the other symptoms between tuberculous neoformation and neoplasm.

For example : if one has punctured a very large abdominal tumour and drawn only blood it is almost certain to be neoplasm (sarcoma, lymphadenoma, etc.), and not tuberculosis, because a tuberculous mass of such dimensions would be broken down in the centre. On the contrary, when one punctures a small cervical gland, mobile and not very hard, if one withdraws only blood, one does not therefore conclude it is neoplasm, but rather a tuberculous adenitis, not yet suppurated.

Similarly, if one withdraws blood from a swelling developed near a joint or a bone which **one knows to be attacked by tuberculosis**, one should conclude, in spite of the fact that only blood has issued, that it is a tuberculous mass not yet broken down, and not a neoplasm.

It is not the same when the diagnosis of the nature of the disease of a bone or of an articulation has not yet been made : there is, for example, a patient who has come to you with a tumour which is resilient, or fluctuates or appears to fluctuate, and has developed very rapidly (in a few weeks or a few months) round a bone or a joint : one hesitates between the diagnosis of sarcoma and tuberculosis.

One punctures this softish and bossed swelling : if blood is found, it is rather a neoplasm, because a tuberculous neoformation of a certain size, as we have said, will produce at least a few drops of pus.

We may add that, if one can, very exceptionally, find blood in the cavity of a cold abscess, the blood is blackish, already more or less modified, full of small clots, and often contains drops or traces of pus (v. Chap. III).

But, in all these cases, I repeat, one has, in order to establish the diagnosis, something besides puncture, one has the assistance of concomitant symptoms.

3rd. **Nothing appears** (in spite of the fact that you are assured that the aspirator was exhausted, that the needle was permeable, that it was there you had felt the swelling; in the end you have withdrawn the needle and seen that it contained no debris, fungous or caseous).

Before affirming that there is no abscess, remember that some

pus from cold abscesses is too thick to flow through the needle n° 3. You ought then to make a second puncture, this time with needle n° 4.

But needle n° 4 does no better.

This time, having been assured by a new palpation that a tumour really exists, that it is not a phantom tumour, you are forced to the conclusion that there is no abscess, that it is a solid tumour. Lipoma, Myxoma, Neoplasm? The diagnosis is made from all the other existing symptoms, but we have not to study it here. We have here only to establish whether there is an abscess or not, which is done.

If we recapitulate what ought to be derived from puncture of a mass situated round a joint or a bone recognised as tuberculous, we see that we ought to have, according to the case, three different results :

Either the needle has elicited nothing, and it is a question of fungosities not yet softened;

Or, the needle has withdrawn some debris of whitish material, which is an indication that the tumour has already commenced a caseous degeneration;

Or, it has withdrawn some drops of pus or of serum, with or without clot; then the existence of an abscess ready for puncture is evident.

The Diagnosis of the Origin of the Abscess.

You have recognised the abscess. A second question is placed before you : that of enquiry as to whether it is essential or symptomatic (that is, symptomatic of a glandular lesion, or of an osseous or articular lesion not yet suspected).

For instance, in the case of an abscess of the cervical region, one ought to establish whether the abscess is idiopathic (developed in cellular tissue), or whether it is a suppurated adenitis, or whether it comes from an adjacent osteitis, which is, in fact, almost always a Pott's disease.

Again, for instance, in the case of a cold abscess of the thigh, you ought to find out if it is essential or symptomatic, and it may be symptomatic either of an inguinal or iliac adenitis, or of an osteitis of the femur, or of the pelvis, or of a coxitis, or of Pott's disease (either sacral, lumbar or even dorsal).

To know which it is, examine carefully the joints and bones in the vicinity of the abscess.

The question of the origin of the abscess is certainly worth the

trouble of being raised and threshed out, if only to institute the orthopædic treatment of an osseous or articular lesion, often until now overlooked.

From the point of view of the treatment of the abscess itself, there is not, fortunately, any difference between idiopathic and symptomatic abscesses. The only rational treatment for all of them is puncture and injection.

So that even if you have been deceived, in some exceptional case, as to the origin of a cold cervical abscess, if you have thought of a simple adenitis that has softened, when in reality it is a question of an abscess due to Pott's disease, the damage will be nil, or almost negligible to your patient, because you will treat all abscesses by the only method, that of puncture and injection, which cures them all, whatever be their origin, idiopathic or symptomatic.

But the same impunity and harmlessness is not assured to practitioners who open cold abscesses. They, when they are deceived as to the origin of an abscess, when they open an abscess by gravitation in Pott's disease, thinking it is a matter of a broken down gland, commit an error which may be disastrous to the patient, for if the opening of an idiopathic abscess, of a suppurated adenitis, is a reparable evil, on the contrary, the opening of an abscess in Pott's disease has, as you

know, for its ordinary consequence, the death of the patient at an earlier or later date.



Fig. 988. — Large subcutaneous abscess of the left popliteal space.

The treatment of Cold Abscesses.

We have nothing, or next to nothing, to add to what has already been said upon this subject in Chap. III, IV, V, VI and VII of this book, upon the treatment of symptomatic abscesses and idiopathic abscesses.

The treatment of both is identical. The difference in their origin does not alter in any way their therapeutics.

There is only one treatment for cold abscesses; that of punctures and injections.

Extirpation, even in the case of a very accessible abscess

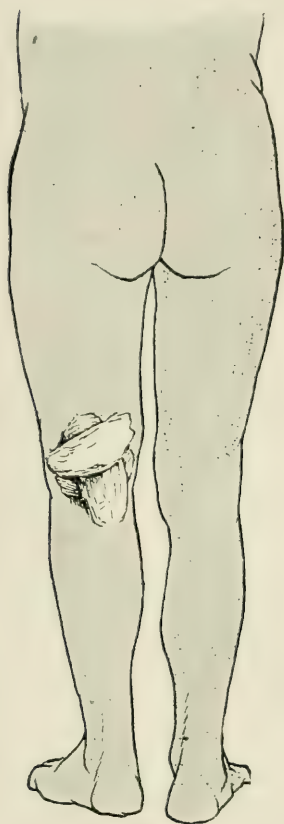


Fig. 989. — Squares of damp absorbent cotton arranged for the compression of the abscess after a series of punctures.

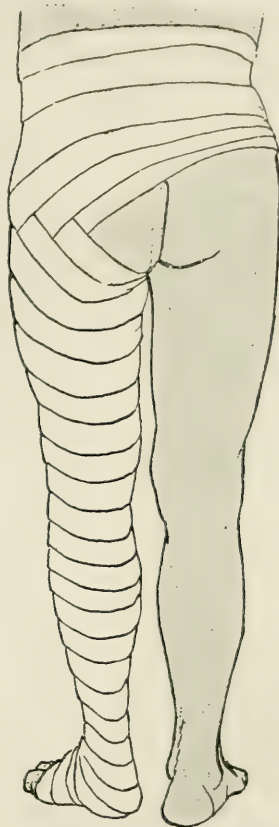


Fig. 990. — Compressive bandage commencing at the toes to produce the approximation of the walls of an abscess of the thigh or the groin.

(fig. 988), and widely performed, does not ensure against a relapse, which may always supervene either immediately, the wound failing to close by first intention, or after few weeks or

months, consequent upon the rapid increase of fungosities in the deep parts.

I do not speak of bacillary inoculations at a distance, of lung or of brain, nor of tuberculous colonisations or generalisations, always possible after surgical extirpation. (I do not wish to exaggerate the danger, which is small, I admit, but nevertheless real).

On the contrary, the treatment by puncture and injection cures certainly, cures relatively quickly (in 6 or 7 weeks), it presents no risks, it is easy of application for all, by all and everywhere.

The *technique* is that already indicated in Chap. III, where we have given the nature of the liquids to be injected, the number of sittings and the intervals between them.

After the seventh puncture (this is not followed by injection) one compresses methodically the walls of the abscess with squares of wool, placed cross-wise, and Velpeau bandages, by causing the compression to begin at the extremity of the member, in order to avoid œdema of the hand or foot (fig. 989 and 990). Every four days, one adds one or two new Velpeau bandages, in order to keep up compression at the desired degree.

By this compression, energetic and methodic, continued for 15 or 20 days, one causes the approximation of the walls of the abscess, which means a complete cure.

B. — TUBERCULOUS OSTEITIS

We have spoken (in another part of the book) of the treatment of tuberculous osteo-arthritis. One may surmise, from that, what will be the treatment of tuberculosis of any bone whatever, easily accessible (fig. 991).



Fig. 991. — Costal tuberculosis with two foci, one on each side, almost symmetrical, operated on and become fistulous on the left side; abscess closed on the right. The closed abscess has been cured by punctures and injections; the fistula on the left has been cured also, a little later, by our paste injections of creosote, iodoform and phenol camphor (v. p. 177).

a) In the case of an **abscess** already formed (appreciable periosteal abscess), one makes punctures and injections in the ordinary way.

b) In the case of fungous osteitis **without abscess**, one looks for hardening or softening of the accessible fungosities in the bone or in the periosteal tissues.

One knows by what means this hardening and softening is obtained (v. p. 165).

C. — TUBERCULOUS TENDINOUS SYNOVITES, SYNOVIAL CYSTS AND HYGROMAS

a) In the *liquid form* (for example, the synovial cysts of the sheaths of the hands), the treatment is that of ordinary cold

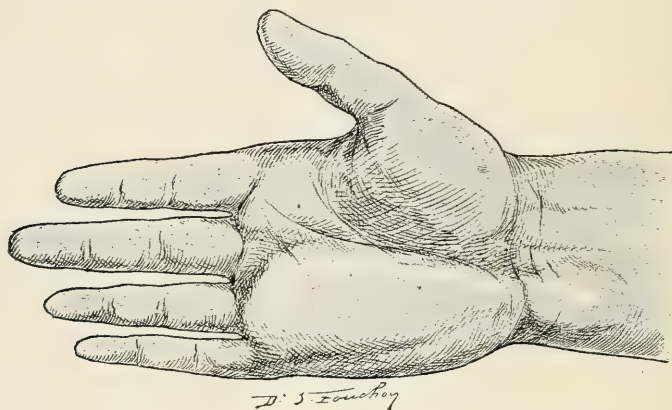


Fig. 992. — Fungous synovitis of the palm of the hand.

abscess (fig. 992 and 993); if there exist rice-shaped grains, too large to pass through the hollow of the needle n° 4, inject

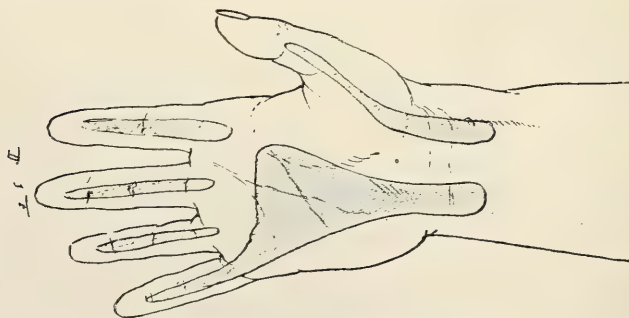


Fig. 993. — Synovial sheaths of the hand.

naphtol camphor, which will dissolve them in a few days.

b) In synovitis *without suppuration*, one promotes hardening or solution of the fungosities, by injecting iodoformed oil or naphtol camphor into the actual cavity of the serous sheath, as if one were dealing with a white swelling, which is nothing else than an articular synovitis.

But especially, *no surgical operations which*, here again, *rarely cure, often aggravate and always mutilate.*

Extirpation, if it is to be at all complete, causes exfoliations or tendinous necroses, bringing in their train grave functional weakness.

D. — SPINA VENTOSA

Know that, if one takes *en bloc* all the cases of spina ventosa, one third are syphilitic, one third are mixed, that is to

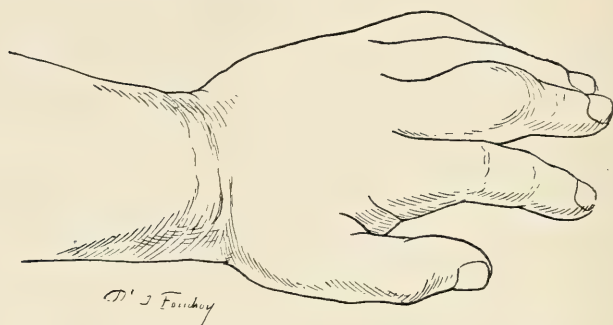


Fig. 994. — Spina ventosa of the second phalanx of the middle finger.

say, are scrofulous and syphilitic (v. p. 949) and one third only, purely tuberculous.

You must *in all cases* of spina ventosa, commence by insti-

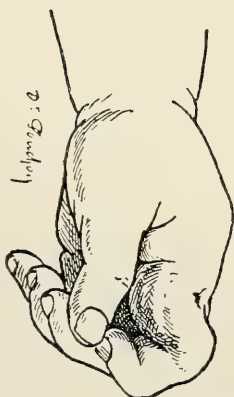


Fig. 995. — Spina ventosa of the first phalanx of the index and little fingers.



Fig. 996.
The same seen on the dorsal aspect.

tuting a *test treatment* with mercury or iodide of potassium, but insisting more particularly on the iodide (v. p. 950).

This specific treatment will give *once in three cases* a complete cure, and in another third, a manifest improvement.

In a case of tuberculous spina ventosa (fig. 994 to 999)

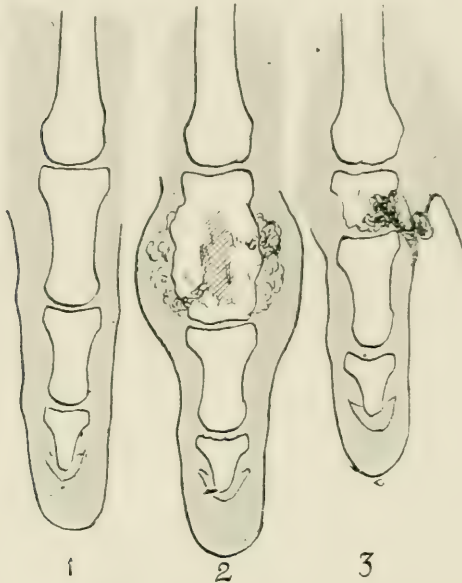


Fig. 997. — From radiographs.

1. Sound finger. 2. Spina ventosa of the first phalanx, the bone is expanded and inundated with fungosities. 3. Two thirds of the bone have disappeared; what remains communicates with the exterior by a fistulous track.

which has shewn itself obstinate to specific treatment, you will carry out the general and local treatment of all the external tuberculoses — with constant care to safeguard the integrity of the skin, here so near to the affected bones.

It is necessary, therefore, to attack the focus only by very careful injections, in a dose of a few drops, the injections spread out and made each time at different points.

And, for the same reason, one must in a general way prefer

oil, creosote and iodoform to naphtol camphor which, by causing a very lively reaction, might compromise the vitality of the integuments, sometimes already damaged by tuberculosis.

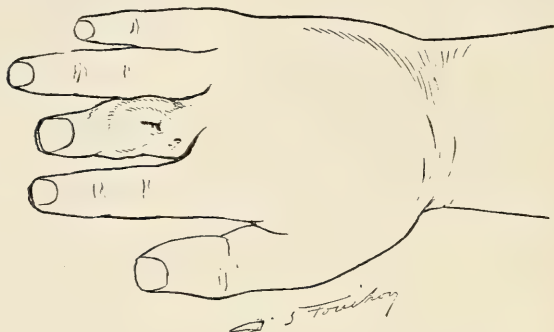


Fig. 998. — Spina ventosa of the middle finger cured with destruction of one phalanx.

As in coxitis, one will make the injections **from the beginning** of the disease, if one wishes to prevent the softening of the bones, which conduces inevitably to their destruction.

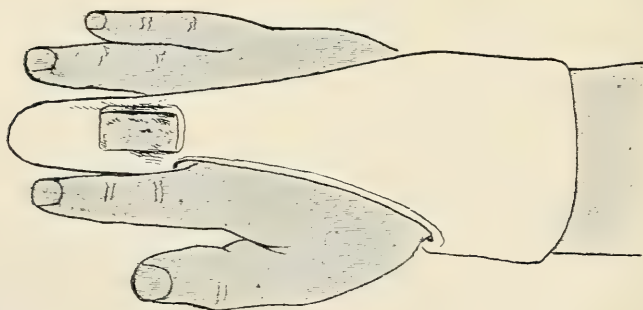


Fig. 999. — Fenestrated apparatus for spina ventosa.

“At the beginning”, does not mean at the first small thickening of a millimetre of the phalanx (at this stage one simply applies round the finger a layer of one or two millimetres of mercurial ointment), but one will commence the injections

immediately after this first period, immediately that the lesion has shewn a manifest tendency to progress (fig. 997, 2).

Orthopædic Treatment in Spina Ventosa (v. fig. 999 to 1001). One ought to support, to prop up the affected bones, in order to avoid spontaneous fracture.

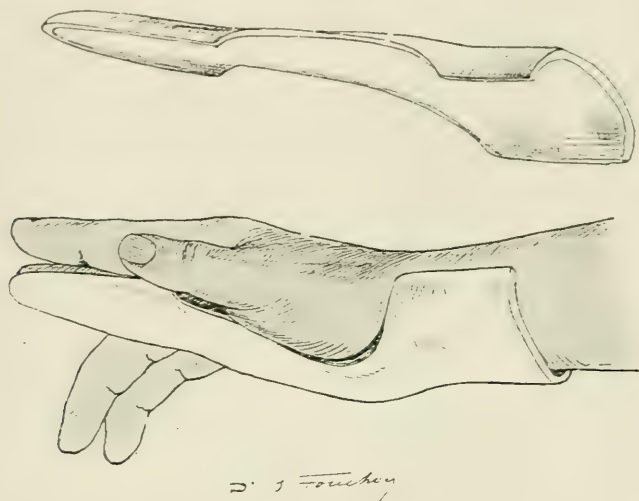


Fig. 1000 and 1001. — Bivalve apparatus for spina ventosa.

At the beginning, then, mercurial ointment and plaster sheath.

Later, when one makes the injections, one also puts on a **plaster**, with openings at the proper place for the injections.

The same again, in the case of fistulae, one applies a small fenestrated plaster. — But if there are too many open foci, it may be better to divide **the plaster into two valves**, which one can remove and replace at each dressing (fig. 1000 and 1001).

E. — TUBERCULOSIS OF THE TESTICLE AND OF THE EPIDIDYMIS

This tuberculosis ought to be treated by conservative means (punctures and injections).

At the beginning of my practice, I operated upon the patients as most surgeons did and unfortunately are still doing.

For eighteen years, I have not performed any castrations : I use exclusively injections, and, in more than 200 cases of children or of adults thus treated, I have not had a single failure.

And I include in this number, not only closed tuberculoses,



Fig. 1002. — Tuberculous Epididymitis on the left side. The tinted zones represent ; on the right, the limits of the normal epididymis : on the left, the limits of the affected epididymis.



Fig. 1003. — Tuberculous epididymis. 1, 2, 3, 4, 5, points where one must make injections (sometimes at one point, sometimes at another).

but also all fistulous tuberculoses, which accounted for about one third in the total list.

The cure had required from 2 to '4 months for the closed tuberculoses, and from 3 to 10 for the open tuberculoses.

Treatment in addition to that required for adenites (p. 884).

1st. Hard tuberculoses (fig. 1002 and 1003).

One proceeds to sclerose them or to dissolve them. On account of the peculiar sensitiveness of the integuments, I recommend here, especially for lesions only skin deep **to look for sclerosis** (oil, creosote, iodoform), **rather than solution** (naphtol camphor,

with which one courts a slight risk of damaging the skin).

2nd. **Suppurated Tuberculosis.**

Punctures and injections as in all cold abscesses.

3rd. **Tuberculosis with fistulæ** (fig. 1004).

Injections of our paste (v. p. 176, and fig. 181, p. 222).

In the case of **hydrocele** symptomatic of a **tuberculous**

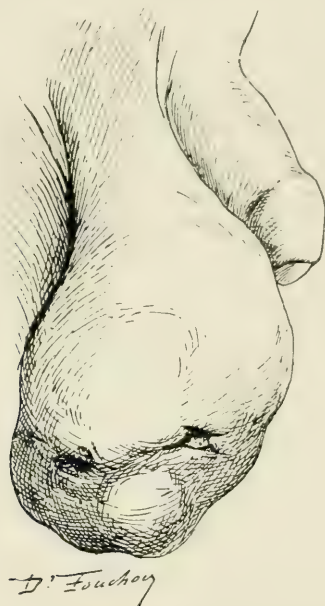


Fig. 1004. — Tuberculous epididymitis with fistulæ. Injections of our paste.

lesion, you will make punctures and injections into the tunica vaginalis, as in an ordinary cold abscess. In four out of six cases observed, an injection of paste was sufficient to bring about the cure of the adjacent epididymitis, without directly treating it; in the 2 other cases, we treated the lesion of the epididymis afterwards (by supplementary injections), as if the lesion had been isolated.

I repeat that I have arrived by these methods, on every occasion, at the cure, very simply and without any risk of

tuberculous generalisation, which one is not able to say, by any means, of castration. I know a considerable number of cases where one has seen it break out, some months after the operation, either as phthisis or as cerebral tuberculosis.

I do not speak of the mutilation, so painful and so humiliating, which castration entails, and especially double castration! And tuberculosis so often involves the two sides, either simultaneously or in succession.

F. — TUBERCULOSIS OF THE SKIN. LUPUS. TUBERCULOMA, CUTANEOUS OR SUB-CUTANEOUS. NON CERVICAL ADENITIS.

In the case of tuberculoma, follow the treatment *in a general way* as in the presence of a cervical adenitis (p. 884).



Fig. 1005. — Bacillary focus opened opposite the malar bone; injections to be made by the retrograde route, by pricking the sound skin; — one may make the injections in a circle around the focus.

Nevertheless, there are some cases where the mass to be dissolved or sclerosed is considerable (of the volume of a large nut, for example); where it is found in such a region that the question of a visible cicatrix is of no importance; where the patient belongs to the working class, and finally, where the tuberculoma is very easy to extirpate in its entirety; I agree that in these particular cases, the danger of relapse or of inoculation and the other inconveniences of the operation, are really so small that they are practically negligible, and ablation, here, is permissible.

It is not the same in the presence of **lupus ulceration** of the face or neck. The skin is too widely infected for one to be able to think of a surgical extirpation.

After having employed a specific treatment as a test treatment (for these lesions are syphilitic or very often mixed, in the same proportions, obviously, as in spina ventosa) (v. p. 922), I attack these lesions by a circle of sub-cutaneous injections of

a few drops of oil, creosote and iodoform or of naphtol camphor (one injection daily, alternating the two liquids), I dress the wounds with Vigo plasters or naphthalin, and I employ, concurrently, radiotherapy (v. p. 931).

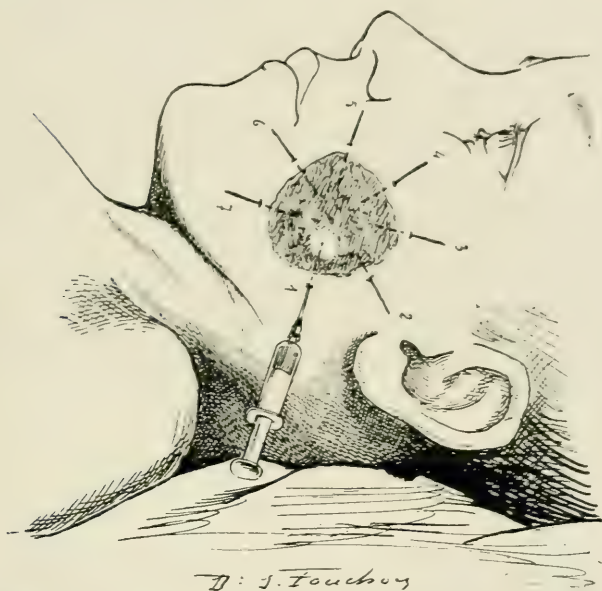


Fig. 1006. — Lupus of the face: 1, 2, 3, 4, 5, 6, 7 points where one will make the injections of 3 or 4 drops of naphtol camphor, — one injection every two days: — 10 injections to be given.

If you have no X ray installation, you can arrive at a cure by the other methods mentioned.

Cicatrization is thus produced nearly always in the space of a few weeks, — with the minimum of traces.

One treats in the same way (by sub-cutaneous injections of a few drops of liquid) non-ulcerated lupus; one arrests it, one overcomes it, and one cures again here with the minimum of "marks" because, after the injections, the skin recovers gradually a nearly normal colouration.

**A personal observation on Tuberculous Lupus
treated by X rays.**



Fig. 1007. — Tuberculous Lupus of the face and neck, dating 4 years. Condition of the patient on arrival at Berck.



Fig. 1008. — After eight sittings at the X rays on the face (date, May, 1905).



Fig. 1009. — After 15 sittings for the face and 5 sittings for the neck (date, July 1905).



Fig. 1010. — Condition of the patient in September 1905.

A word on SPOROTRICHOSIS and its diagnosis with tuberculosis and syphilis.

In the presence of a gumma, of ulceration, of a cicatrix, or of a cold abscess, one ought always to discover if it is a question of tuberculosis or of syphilis. We have already spoken of this diagnosis (v. p. 219) and we will return to it later (v. Chap. xviii).

But there is a third malady of which it is necessary to think in the same way, it is sporotrichosis, — which one is not allowed to ignore, after the work of modern dermatologists, in particular that of Beurmann and Gougerot, who have revealed this malady to us.

Sporotrichosis is so frequent¹, it causes lesions cutaneous and sub-cutaneous which have such a resemblance to tuberculosis and syphilis, that the diagnosis ought to arrest us for a moment.

Like tuberculosis and syphilis, sporotrichosis is presented here² under 4 forms: gummata, ulcerations, cicatrices and cold abscesses.

How to recognise the nature of sporotrichosis in the different lesions? The first condition for the recognition of sporotrichosis is to think of it; for its clinical manifestations are not so characteristic that its diagnosis forces itself upon you; no, you will not find it unless you look for it. And you look for it by attending 1st. to the clinical signs; 2nd., to the test treatment (the treatment by the iodides); 3rd., the culture of the pus (which is here particularly easy and practicable for all practitioners).

I. — Clinical Diagnosis.

When one looks at a case carefully, one may note some clinical differences (well indicated by Gougerot) between the lesions of sporotrichosis and those of syphilis and tuberculosis.

1. **Gummata** (or nodules) of sporotrichosis.

a) Their *number* is much greater than in syphilis or tuberculosis. It is generally from six to twelve, but it may reach 30, 40, 50 and sometimes more than 100, while in syphilis (or tuberculosis) it is rarely more than two or three.

b) Their *situation*. — In sporotrichosis, the gummata are disseminated all over, but especially about the upper limbs and the trunk.

In syphilis they are situated rather in the lower limbs.

In tuberculosis they are especially collected in the glandular regions or very near to bones, for they are generally in relation with lesions of the skeleton or of the glands.

c) *Local characters*. — In sporotrichosis, the lesions are well delimited and very hard, moveable at their bases, and nearly always painless, both spontaneously and on pressure. They may persist indefinitely, as also they may

1. Gougerot goes so far as to say that the disseminated gummata of sporotrichosis are more frequent than the gummata of syphilis and tuberculosis, with which they were formerly often confused.

2. For sporotrichosis may also produce lesions of the skeleton and viscera, but these are not yet well understood.

break down and ulcerate. But then the softening begins in the centre, just against the skin, in such a way as to form a cup-like depression under the pressure of the finger; there remains a peripheral indurated annular margin. But especially there is *no core*.

In syphilis, the nodule is very badly delimited, it becomes painful, oedematous, adherent to the deep parts, and breaks down rapidly in three or four weeks. Finally, here, a *core is constant*.

In tuberculosis, the sub-cutaneous gummata are nearly identical with those of sporotrichosis, and were formerly often mistaken for them. But in tuberculosis it is more a question of infiltration of the skin than primitive sub-cutaneous gummatous tumours, which here are rare.

2. **Ulcerations.** — *Situation and number*; the same differences as above.

Local characters. — In syphilis, the ulceration is generally wide, perpendicularly cut-out at the edge, not loosened, with polycyclic contours (a series of regular arches), the base is sometimes uneven and of the appearance of ham, sometimes yellowish and sloughy.

In sporotrichosis, on the contrary, it is a question of small fistulæ, often so small as to be imperceptible by the naked eye, and one must press the nodule in order to make a drop of pus or serum flow, to indicate the situation of the orifice. This opening may enlarge later, but it always remains narrow and involves only part of the gumma in the form of a small hole with irregular edges. — Sometimes several small fistulæ are found near and are united by cutaneous bands under which one may slide a needle. — They are never confluent as are similar syphilitic lesions. Palpation helps to discover the cup-like softening indicated above. — Finally, there is no core.

If one puncture a syphilitic gumma, the necrosed portion cannot be withdrawn by the syringe; if it is a gumma of sporotrichosis it will be completely emptied.

In syphilis, the lesions at the same stage are contemporary (mostly in the form of ulcerations and cicatrices). In sporotrichosis the gummata are always in different stages; indurated, fluctuating, ulcerated. — Polymorphism.

3. **Cicatrices.**

In sporotrichosis, they are small, often only slightly visible, with ragged margins, with cutaneous tongues. Here, again, there is polymorphism of lesions, which is a prominent characteristic of sporotrichosis.

4. **Abscess.**

In sporotrichosis, the abscesses are large (sometimes 300 gr. and more), often scattered about: thigh, calf, arm, thorax.

In tuberculosis, large abscesses have scarcely ever an autonomous existence, being related to the osteo-articular regions where they nearly always originate.

To sum up, the clinical diagnosis is very often possible and sometimes even easy but in many cases, the clinical differences between the lesions of sporotrichosis and those of tuberculosis and syphilis are much less sharply defined as we have indicated, and the diagnosis remains doubtful. — But, at any rate your attention will at least be awakened in the direction of sporotrichosis, and you will have, in order to dissipate all your doubts, two resources:

2nd. **Diagnosis by the Test Treatment.**

You will prescribe from 4 to 8 grammes of iodide daily. If, after two or three weeks, the cure is attained, it is almost sure to be sporotrichosis, for tuberculosis would not be cured thus, or at least so rapidly, and iodide, without mercury, would not be likely to cure syphilitic lesions.

3rd. **Diagnosis by culture of the pus.**

Culture of the pus gives certainty. But, how to make a *culture of the pus*? Reassure yourself. In this particular case, all of you may succeed, for it is not necessary here to have an installation, nor an incubator, nor a microscope.

It is sufficient to ask, in any laboratory, for three tubes of the prepared nutrient agar-agar of Sabouraud (you can also prepare it yourself in the very simple way described in all the manuals of bacteriology).

You withdraw, with your puncture needle No. 4, a few cubic centigrammes of pus (from one or several fluctuating gummata) and allow a cubic centimetre of the pus to glide down the side of each tube. The tubes must not be capped, nor placed in an incubator; you leave them in a warm room, whenever possible. On the fourth or fifth day, you see that there are developing in the tubes some colonies, which, towards the twelfth day, are quite characteristic.

They have at first the shape of hemispherical white spots of from 5 to 6 millimetres in diameter and are very smooth; but they soon become wrinkled and take on the aspect of cerebral convolutions; from white they become of a chocolate brown.

If you have no tubes of nutrient agar-agar, or you do not wish to make the culture yourself (which is however quite easy), simply collect the pus in a sterilised tube or pipette, and send it to a laboratory. The pus preserves its virulence completely for months, and it will help you, if you wish, to make an ulterior diagnosis. In a case where you have no suppurating lesions, but only warty ones, it is necessary to scrape the wart with a bistoury or sterilised forceps, in order to tear away from the wart some strips of skin or scales, which you will dispose with a platinum wire, at separate points, over the surface of the gelatin.

Iodine Treatment, internal and external.

We have seen that iodine also serves as a means of diagnosis. One prescribes iodide of potassium, or rather the iodides combined, in doses of from 2 to 8 grammes per day, proceeding gradually, being guided by the tolerance of the patient. Externally, local applications of tincture of iodine. This treatment generally effects a cure in a few weeks.

Local treatment of small or large abscesses of sporotrichosis. **Never open them**, any more than you would cold tuberculous abscesses; but treat them like the last, by puncture, injecting afterwards 5 to 10 drops of tincture of iodine.

The ulcers may be touched with tincture of iodide and dressed with a solution of iodine made thus: water, 500 gr., Iodide of Potassium, 10 gr. Iodine, 1 gr.

This treatment should be pursued for one or two months longer, after the complete clinical cure of the symptoms.

CHAPTER XX

A WORD ON THE TREATMENT OF MULTIPLE TUBERCULOSES

When a patient presents two tuberculous foci, the treatment does not present anything in particular. But it is not so if a greater number of foci exist, — for instance 4, 5, 6, 10, 20 foci, distant one from the others.

Such tuberculoses are very frequent.

Thus I have actually more than twenty under treatment (v. fig. 1011, 1012, 1013); among others :

A boy of twelve years, with double coxitis and three spina ventosa.

A girl of eight years, with three tuberculous glands, Pott's disease, a suppurated coxitis, and a white swelling of the knee.

A little Russian boy with 19 open foci in the elbows, the wrists, the fingers, the knees and the feet.

Another little Russian with 12 open foci of the right cheek, of the hands and feet, and of the left leg.

A girl from Corfu with a bacillary peritonitis, a white swelling of the instep, a spina ventosa and a double cervical adenitis.

What is one to do in the presence of this generalised infection of the organism with tuberculosis?

The treatment may be summed up in two words : it is necessary to make a **maximum of general treatment** and a **minimum of local treatment**.

I will explain.

GENERAL TREATMENT

You place the child at complete rest and in the open air of the sea side or of the country — and you make him live there 2 years, 3 years, 4 years, over-feeding him, watching over his hygiene and preventing all brain work.

LOCAL TREATMENT OF A TUBERCULOUS FOCUS

1st. VARIETY : *The foci are closed and have not suppurated.*

You **immobilise** the affected organs, **that is all**. You will **not** introduce modifying **injections** into the foci.

It is necessary to protect the child even from the very small traumatism caused by repeated pricks and from the slight reaction the injected liquid would cause.

2nd. VARIETY : *The foci are closed, but suppurated.*

A. — *For the extensive tuberculosis* (Pott's disease, coxitis, white swellings) you confine yourself to what is **strictly necessary**, in order to **prevent the opening**.

The strict minimum is to make punctures as rarely as possible, and **without injections**¹.

1. But you will do, mind you, what is indispensable, that is, all that is necessary to prevent the opening, which, in cases of profound tuberculosis, creates too great a danger of secondary infection.

Of two evils, one ought to choose the less. The slight intervention such



Fig. 1011. — Multiple foci, on the frontal bone, the malar bone (open) the cheek (open) the elbow (open) and on the side of the thorax (ready to open).

B. — For suppurated superficial foci.

a) If they are **few in number**, 2, 3 or 4 only, if it is a question of a cervical adenitis or a sub-cutaneous cold abscess with the skin intact, you make in the same way, evacuations without injection, and you endeavour to **prevent the opening**.

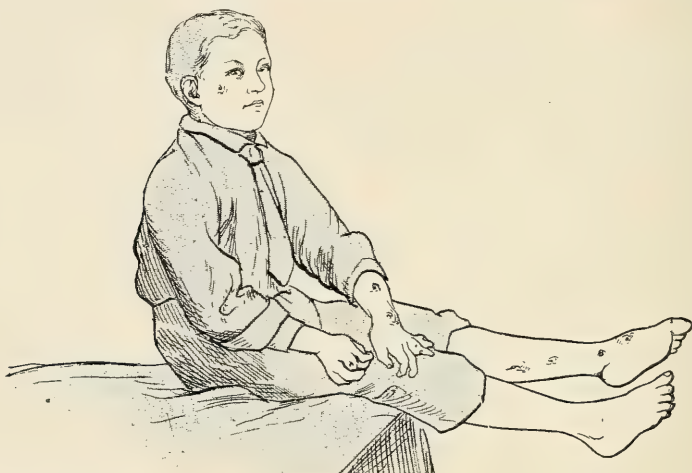


Fig. 1012. — One focus on the face below the right commissure, one on the middle finger of the right hand, two on the two last fingers of the left hand, two others on the side of the wrist and above the wrist, four on the left foot (medio-tarsal, 1st. and 3rd. meta-tarsal, and 2nd. toe); lastly, two collections on the left calf. The child has been marvellously cured by a sojourn of two years at Berck.

b) But, if the foci are **very numerous**, for instance 8, 10, 12 or more, as in the children quoted above, if the skin be menaced, all the more, if it is invaded at several points by tuberculosis, for instance in the case of multiple cutaneous gummata, of spina ventosa involving a great number of digits, in the presence of these foci, which are “too many” it is best **to do nothing** rather than make each day 10, 15, and more

as punctures, made at great distances from one another, does not present any appreciable danger of bacillary inoculation; on the contrary, the spontaneous opening would afford too many chances here, in these cases of profound tuberculosis, of leading to fatal visceral degenerations.

punctures, as would be necessary, in order to have some chance (without having the certainty) of preventing the opening. In such cases, leave them to open!

To wish to insist here on multiplied punctures and injections



Fig. 1013. — 19 foci; right elbow, right thenar region, left hand, left thigh and leg, right ankle.

The cure was complete after 10 months at Berck.

which fatigue the patients, enervate them and lessen their appetites and their sleep, one would incur the **danger** of sowing tuberculosis all over the patient¹, of **hatching small foci** at

1. With all the greater reason would it be necessary to prevent any surgical operation.

I know very well that I am here in complete disagreement with some great master who finds, on the contrary, in the multiplicity of lesions, the

every point of the **vulnerable organism**, and, in particular, in the brain.

It is a case (the only one) where a rule given throughout this book for the treatment of suppurated tuberculoses must be relaxed.

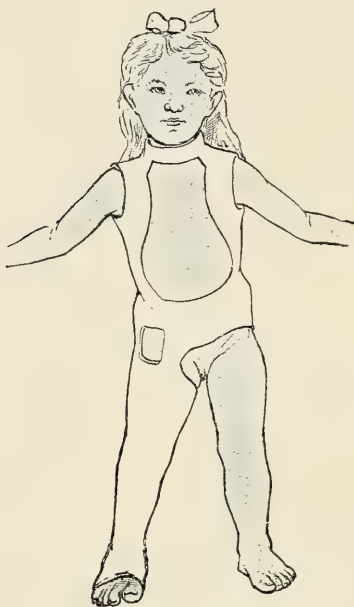


Fig. 1014. — Apparatus for coxitis and Pott's disease. The opening in front of the groin is for the treatment of an abscess in the hip joint.

The spontaneous opening of these **superficial** tuberculoses, I repeat, has no inconvenience, neither as to danger of secondary infection, the drainage being perfectly made, nor as to

more reason for operating. He advises multiple and "successive" operations, because (he admits it) these lesions are cured but little or not at all, by operation. Well, I reply that **operation is an error and a fault, graver here than elsewhere**. I also have operated on these multiple tuberculoses formerly, alas, and I have seen, not only that **operation did not extinguish the focus**, but that it **stirred it up and set alight** the disease in the lung and the brain. I have several times, in similar cases, observed post-operative generalisation of tuberculosis...

danger of tuberculous inoculation, seeing that there has been no bleeding.

This had to be expressed all the more clearly, as it appears



Fig. 1015.

at first sight to be in opposition to the rules we have formulated for the treatment of tuberculosis.

The contradiction is only apparent, as you see after these explanations.

The Orthopædic Treatment.

From the orthopædic point of view, there is no real difference between the treatment of multiple osteo-arthritis and that of single osteo-arthritis.

The apparatus will be similar in the two cases.

In double hip disease, for instance, one will make simply a plaster including the two thighs.

If there exist at the same time a Pott's disease and a hip disease, you will make a single apparatus reaching from the neck to the knee, or even to the foot. You will arrange for a dorsal opening (fig. 1015) for the compression of the gibbosity, and, if need be, an opening at the hip, in order to inspect the abscess, or any suspected point.

All this is self-evident.

CHAPTER XXI

SYPHILIS OF THE BONES AND ARTICULATIONS

HOW TO DISTINGUISH A SYPHILITIC LESION FROM A TUBERCULOUS LESION

The physicians at Berck ought to think more about syphilis and the physicians of Saint-Louis more about tuberculosis.

The diagnosis, of capital importance, is often mistaken, perhaps even most often.

If the misfortune is not very great when one treats as syphilis a tuberculous lesion, think of the consequences the opposite error occasions, when a syphilitic lesion is treated as a tuberculous one.

I might quote children who have undergone, without success, three or four erasions of bones for osteitis, so called tuberculous, and whom I have cured, in two months, by specific treatment, of the disease considered incurable.

Alas! I know also of two patients who had undergone amputation, one of an arm, the other of a leg, who came to Berck for lesions ticketted tuberculous, similar to the old lesions (that is, to those which had caused amputation) and who were cured by anti-syphilitic treatment alone.

It is evident that these unfortunate ones would not have been mutilated if their first surgeon had thought of syphilis!

One does not think of it enough. However, it is not sufficient always to think of it in order to avoid an error, for syphilis and tuberculosis may furnish lesions with an *absolute* resem-



Fig. 1015 bis. — A typical case of hereditary syphilis.

blance (Gaucher), and the diagnosis is very difficult in certain cases.

Without wishing to exhaust the question, I desire to give to practitioners some indications enabling them to avoid these

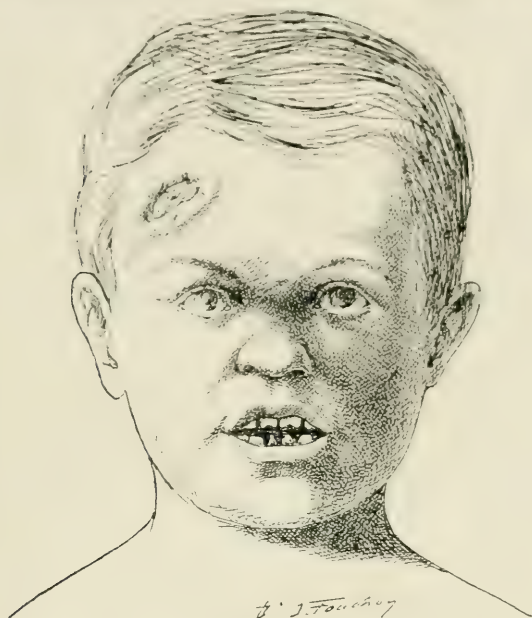


Fig. 1016. — Heredo-syphilitic child; lesion of the frontal bone; nose "en lorgnette"; Hutchinsonian teeth.

very unfortunate errors. — The indications are drawn entirely from my personal practice.

I will sum them up briefly : 3 cases may be given.

1st. Case

A patient comes to you for an osteitis or an osteo-arthritis labelled tuberculous.

Nothing in the clinical characters of the **local lesion** directs the attention towards its specificity, **but interrogation** of the parents, or of the patient, reveals to you **antecedents** not to be doubted (hereditary or personal) of syphilis; or,

again, it is the general **examination** of the patient, which discloses some **blemishes** or **dystrophies** belonging distinctly to syphilis (acquired or hereditary, fig. 1016 to 1022) : teeth dwarfed, notched, and striated, deafness, ocular lesions, the triad of Hutchinson, or again divers exostoses, vault of palate



Fig. 1017. — Hutchinsonian teeth.



Fig. 1018. — Microdontism.



Fig. 1019. — Atrophy of free margin.



Fig. 1020. — Amorphiam.

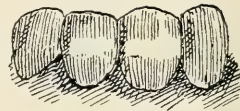


Fig. 1021. — White furrow.

in ogee, nose sunken at base, chronic coryza, etc. In these cases, it is natural to refer the osteo-articular lesion to syphilis (and to commence appropriate treatment) — **without affirming anything**, however for it is necessary not to forget :

1st. That a syphilitic subject may have a purely tuberculous lesion :

2nd. That there are mixed lesions, *tuberculous syphilides*, which the specific treatment may ameliorate but not cure.

2nd. Case.

Nothing in the **antecedents**, or the **interrogation**, or the general **examination** of the patient¹ draws our attention to

1. For one may be heredo-syphilitic and remain exposed to all the eventualities of that dangerous blemish, even though one may not shew any dystrophic imprint, any congenital sign (Fournier).

syphilis, but it is *the local lesion* which by its very peculiar characters (v. fig. 1023 and 1024) ought to make us think of it. Also this lesion does not present itself nor is it developed like an ordinary tuberculosis.

What then, are the characteristics properly belonging to syphilis?

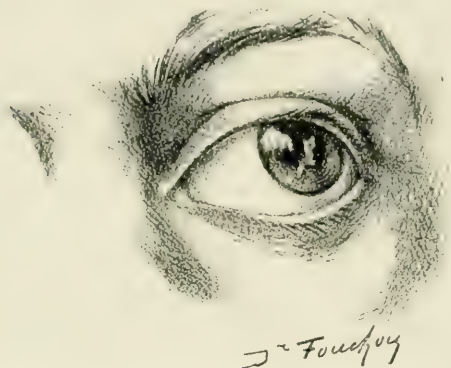


Fig. 1022. Keratitis in a child presenting other specific lesions.

Here they are, from my own personal observations.
The lesion is, or is not suppurated.

A. — *Non-suppurated Osteitis or Osteo-arthritis.*

Syphilis generally produces an hypertrophy of the bones.

a) *An hypertrophy en masse*, either of the diaphysis (sabre edge tibia, ulna spindled, giving the appearance of a spina ventosa), or of the articular extremities (in particular of the knee).

b) *A localised hyperostosis*. — Exostoses.

A syphilitic knee, with exostoses, appears truffled or stuffed with peach stones; sometimes there exist softer foci, by the side of harder ones, separated by folds or interstices. — which give a consistence reminding one of that of lymphadenoma.

It is certain that tuberculosis may sometimes cause an hyperostosis of the articular extremities. But that is infinitely

rare; so rare that, in the case of hyperostosis, 99 out of 100 times, the cause is not tuberculosis, but something else.

For the distinguishing **feature** (it is a question of syphilis, or of osteo-sarcoma, or of osteo-myelitis; see p. 969), of the **tuberculous process** is *atrophy of the bone* (see fig. 1031).

B. — Osteitis or Osteo-arthrits suppurated or fistulous.

It has been affirmed that syphilis does not cause sup-
puration of bones or joints. It is a mistake. Syphilitic osseous suppurations are common; our observations are quite in accord on this point with those of Professor Gaucher.

One very frequently sees syphilitic osteitis ulcerate the skin at one or several points and cause rounded wounds, ham-like in appearance, with sharply cut edges.



Fig. 1023. — Sabre tibiae (with small erosions or cicatrices).

In two cases, I have seen, before opening, the skin assume a violet or rather coppery tint, over a surface as large as a five francs piece, whilst there appeared small vesicles or phlyctenules resembling a burn or an urticaria. After some days, the skin sloughed *en masse* over this large surface (sometimes it has been detached, like a lid) and there came out, in both cases, something like a core, a veritable sausage of 4 to 5 cm. in

length, of the diameter of the little finger, leading down to the bone (diaphysis of femur in one case and iliac fossa in the other). — The **core** was formed of a **gummy** material, viscid, amber-coloured, recalling the soft parts of a lymphadenoma.

In certain cases the suppuration from the fistula is kept up by small splinters which make one think at first sight of a chronic osteo-myelitis (fig. 1025); but the diagnosis will be made by the antecedents of syphilis and by the mode of onset of the symptoms, not acute (in the case of syphilis); moreover the necrosis is always more extensive and deeper in osteo-myelitis than in syphilis.

Those are the physical characters of syphilitic lesions.

These are the *functional signs* :

There are spontaneous **pains**, sometimes very severe, predominating very distinctly **at night**.

The pain is not relieved (or scarcely at all) by rest and by strict immobilisation with plaster. In fact, nothing will overcome these persistent pains, except specific treatment.

No tenderness (or next to none) on pressure, even when pressure is made over the osseous parts where the patient localises the spontaneous pain.

Other Signs.

There are **hydrarthroses** which disappear and reappear with a disconcerting rapidity, and without apparent cause.

The **movements** of the joint are **free** or almost so, even



Fig. 1024. — Hyperostosis of internal condyle of the femur.

in advanced lesions, and movements communicated to them do not revive the pain, or but very little.

Lastly, the **bilaterality** and the **symmetry** of the lesions are frequent, if not the rule.



Fig. 1025. — Heredo-syphilitic. Two lesions of bone in the head and face. Keratitis. Suppurated osteitis of the tibia.

These are all so many physical or functional signs which do not belong (or scarcely ever) to tuberculosis.

When you are in the presence of such symptoms, it will be necessary always for you to think of syphilis, even in default of antecedents and ordinary dystrophies, and having thought of it, it will be necessary to commence a specific treatment which will be here again a *veritable test treatment*.

3rd. Case.

You should think of it also, even when **you fail** to discover the *antecedents* and the *local characters* indicated above, if you have :

a) Either *very numerous* osseous and cutaneous lesions,—when, for instance, there exist 5, 10, 15, 20 foci (gummata or ulcers), and when, especially, in the number, one reckons several as *spina ventosa* (fig. 1026). I have said elsewhere (p. 922) that a third of the cases of *spina ventosa* are syphilitic, one third tuberculous, one third mixed (that is to say, are tuberculous and syphilitic).



Fig. 1026-1027. — Syphilitic *spina ventosa*, belonging to the child in fig. 1010.

b) Or lesions, so-called tuberculous, which are *protracted*, which *resist* in an unaccustomed fashion a good general and local anti-tuberculous treatment, for example, a sojourn at Berck and the local treatment indicated in this book.

c) Or suppurated lesions which *open* and become fistulous *in spite of all your efforts* (in spite of rest and compressive dressings, in spite of punctures not followed by injections, etc.)

In all these different cases think of syphilis and adopt specific treatment, which will confirm or disprove the diagnosis. Adopted in these cases it will give you very often, either com-

plete cure (pure syphilis) or a very notable amelioration (mixed forms, *tuberculosis and syphilis*). This shows you the frequency of syphilis of the skeleton.

The Specific Treatment

The treatment, what shall it be? *Mercury* or *iodide*? (Until the specialists have agreed as to the value of and indications for 606).

M. Gaucher recommends especially mercury, either in the form of injections of biniodide of mercury, or through the stomach in the form of lactate of mercury (in the same way and in the same doses as perchloride of mercury).

Others give the preference to iodide. After experience gained, I like better to combine the two medicaments. But I ought to add that, if I had to choose between the two, I should prefer iodide; because there was a great number of my little patients (and by far the largest number) in whom mercury did nothing, and who afterwards were perfectly cured by iodide. But I combine the two, as I have said, — and for that, in the place of Gibert's syrup, which is not always tolerated, I give the following preparation, which I owe to Professor A. Robin :

Biniodide of Mercury	0 gr. 20
Iodide of Potassium	20 gr.
Distilled Water	20 gr.
Syrup of Wild Pansy	160 gr.
Simple syrup.	200 gr.

Two soup-spoonsful a day (for an adult) in Vichy water.

One recommends the following tooth powder, due also to

M. Robin :

Precipitated carbonate of Lime	80 gr.
Soap	18 gr.
Camphor	2 gr.

Conclusion

In the presence of a lesion said to be tuberculous, of a bone or of a joint, think always of syphilis : either to incriminate or to exonerate it.

In all the cases indicated here, and in all those cases which remain ever so little doubtful, that is, in short, *in the major part of the cases of osteitis, or of osteo-arthritis labelled tuberculous*, do not hesitate to submit the patient for *a few weeks*, to a *specific treatment*.

This treatment will not cause, in itself, **any inconvenience** (Gaucher), and will afford you very often, either a cure (syphilis pure) or a great improvement (tuberculosis and syphilis): the result is attained by 2 or 3 months of treatment.

In cases where it produces no effect, it will not have been altogether useless, since it will have definitely fixed for you the diagnosis, of the true tuberculous lesion, up to this time doubtful ¹.

Why, you will ask, do you not have recourse in cases of doubt ² to the microscopic search for the bacillus in the pus and its inoculation into the guinea pig?

1st. Because they are not practical methods for the bulk of practitioners.

2nd. Because the examination of tuberculous pus reveals but rarely the presence of Koch's bacillus, and the inoculation of the guinea pig is not always positive; so that, on the whole, it is more certain, and especially more practical, to have recourse to the test treatment in order to make a diagnosis.

1. Osteitis deformans would be syphilitic according to M. Lannelongue; but M. Robin has demonstrated that the chemical composition of the bone of Osteitis deformans is different from that of syphilitic bones.

2. The ophthalmo-reaction, if it is positive, evidently gives one more presumption in favour of tuberculosis.

CHAPTER XXII

THE TREATMENT OF OSTEO-MYELITIS

We are going to study in succession the treatment of acute osteo-myelitis¹ and that of chronic osteo-myelitis which is, nearly always, only an acute osteo-myelitis which has subsided and become protracted.

I. — Acute Osteo-myelitis

A. — *Diagnosis.*

First, a word upon *diagnosis* (fig. 1028 to 1033) not to go over again here the classical picture of acute osteo-myelitis with its origin by marked constitutional disturbance and all the signs of a profound intoxication of the organism (has it not been called *the typhus of the limbs?*) and with, on the contrary, very few local signs, so that one may very easily misconstrue the nature of the symptoms, if one did not by absolute rule, **in every feverish child, examine the limbs as instinctively as one examines the pharynx or the lungs.**

No, I do not wish to go over again this classical picture, but to tell you, on the contrary, that **the picture is too classical**, and that it does not represent, far from it, all the cases of acute osteo-myelitis, but only the most toxic amongst them, the only ones, it is true, which you have generally had occasion

1. *Osteo-myelitis* is, as everyone knows, inflammation of the bone produced by the staphylococcus and the streptococcus.¹

See, for its diagnosis with tuberculosis figures 1030 and 1031 with their descriptions. See, for the diagnosis with osteo-sarcoma, fig. 1032 and 1033 with their descriptions.

to see, as students, **in the children's hospital where osteomyelitis is synonymous with urgent operation**; I wish to warn you, in a word, that you will often see, **in private practice**

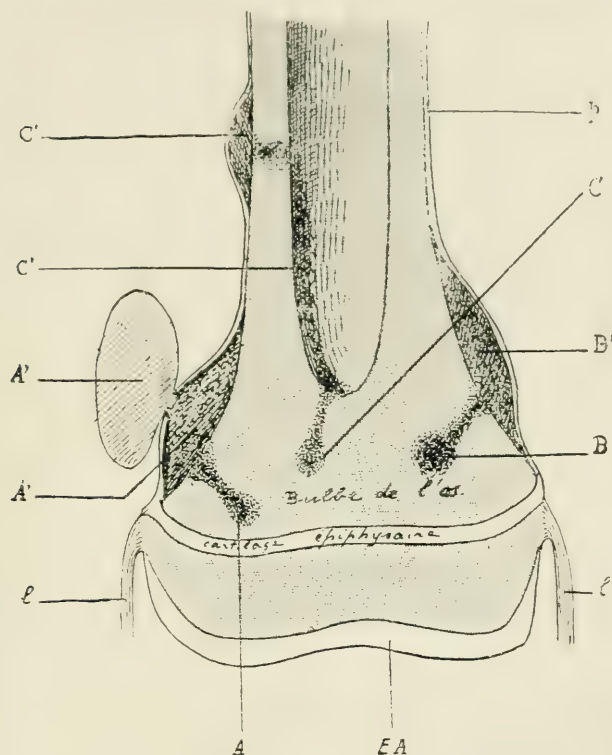


Fig. 1028. — Sketch shewing the point of origin and the progress of the infection.

The point of origin over the bulb of the bone near the epiphysal cartilage.

Four routes; either AA' passes under the periosteum, forms an abscess, then burst through the periosteum and spreads into the soft tissues. Or, BB' remains in the condition of a subperiosteal abscess. Or CC' passes into the medullary canal and then finds its way beneath the periosteum. — It is rare, but not impossible, for the focus to traverse the articular cartilage and force its way into the joint cavity. — l. Articular ligaments; EA, articular cartilage.

cases of osteo-myelitis **much less infectious**, developing in the way of a phlegmon of the soft tissues, from which you will know how to differentiate them, because in osteo-myelitis, the swelling

starts from the bone and the pressure of this, opposite to its extremity* (fig. 1028), — that is to say, opposite to the junction of the diaphysis and the articular cartilage, — is particularly painful.

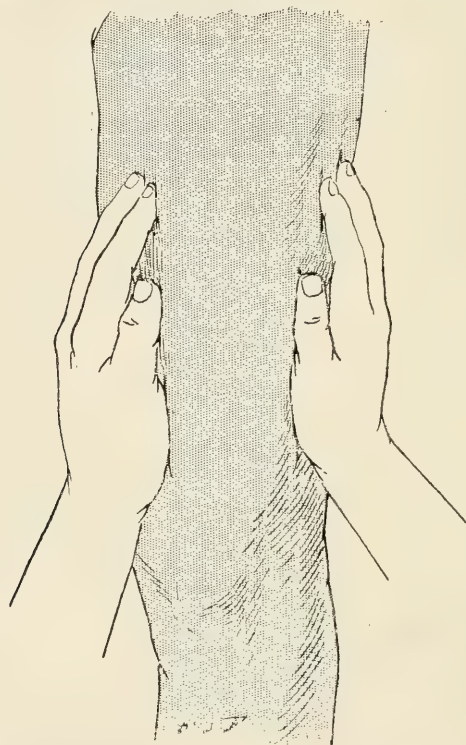


Fig. 1029. — Acute osteo-myelitis of the thigh; to find the pus, palpation is made by the hands placed flat on the two opposite sides of the limb: wide palpation, on the surface. If the two hands are not disposed in this way, one will not feel the fluctuation; the pus spreading over to the other surface may escape the search.

This distinction between the two forms of osteo-myelitis is of the first importance, for the treatment differs a great deal in the two cases.

B. — *The Treatment:*

1st. *variety*. — Osteo-myelitis of medium gravity. —

The disease is presented here, and goes on developing, as a **local affection**. The fever remains above 39.5°. There is no albumen in the urine. The general condition is serious, but there is nothing to cause anxiety, at least for the present.

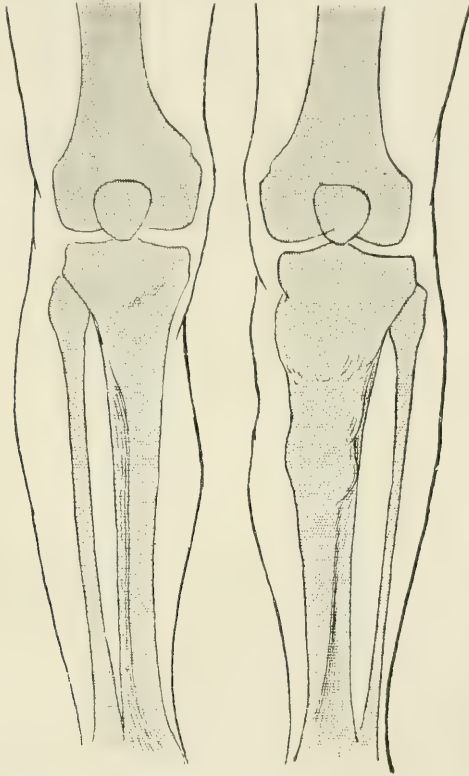


Fig. 1030. — Osteo-myelitis of the left tibia (from a radiograph). The bone is hypertrophied and irregularly bossed; the swelling is not limited so markedly as in osteo-sarcoma. The right tibia is sound and normal.

On the other hand, the signs of inflammation of the bone are very distinct: there is painful puffiness over the femur, or the tibia, or the humerus (according to the case), situated over the diaphysis, but very near to the extremity of the bone (fig. 1028).

Proceed here as if you were in the presence of a phlegmon.

When the local signs are distinct and well localised, you incise the soft tissues (but **without trephining** the bone).

a) (Fig. 1028. A). If the *fluctuation* is *very distinct* and

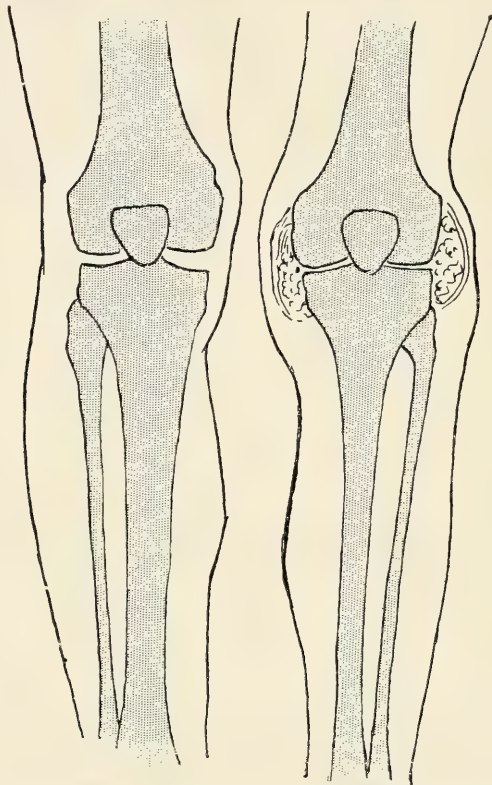


Fig. 1031. — White swelling of the knee (after a radiograph). Atrophy of the skeleton on the affected side; increase in volume of the knee, proceeding from the distension of the synovial cavity by fungous masses. — Compare with fig. 1030. Other elements of diagnosis with osteo-myelitis: tuberculosis generally involves the articular extremities; osteo-myelitis nearly always the diaphysis. The onset is insidious in tuberculosis, acute in osteo-myelitis, etc.

sub-cutaneous, you will attack the collection by incising it, for 3 or 4 cm., you will drain it well, and that is all.

b) (Fig. 1028. B). *No fluctuation is appreciable* in the soft tissues, but a **bogginess**, very distinct **in the deep parts**,

forming a **casing** round the bone, with a small point particularly resilient.

You will proceed, with your bistoury, to attack this point

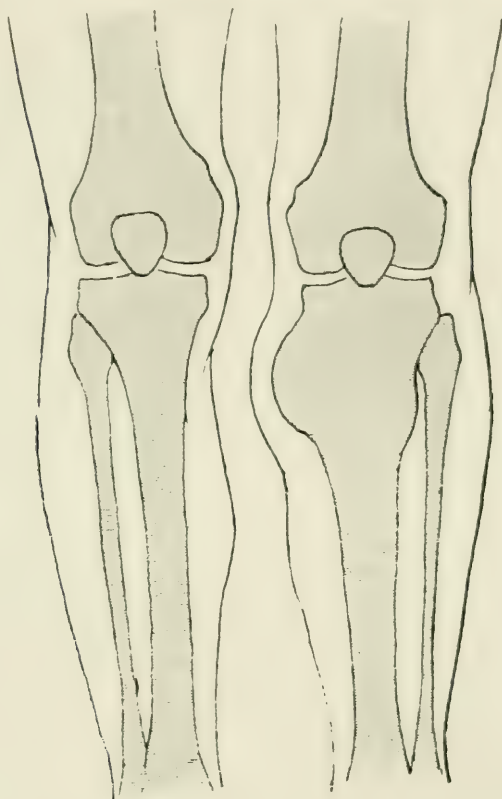


Fig. 1032. — Osteo-sarcoma of the tibia (from a radiograph). Diagnosis with osteo-myelitis. In osteo-sarcoma the bone is like a club, it is fusiform in osteo-myelitis (see fig. 1030). In osteo-sarcoma the onset is insidious, there is scarcely ever fever, development less rapid.

by passing between the muscles or between two muscle fasciæ, and you will go forward until you have found pus.

You make a wide incision of from 3 to 4 cm. in the resilient mass and introduce a large drain.

If you do not find pus outside the periosteum, you open it up by a cross shaped incision of 3 cm. in each direction and you will drain thoroughly (fig. 1034).

That is what you will do, but this is **what you will not do.**

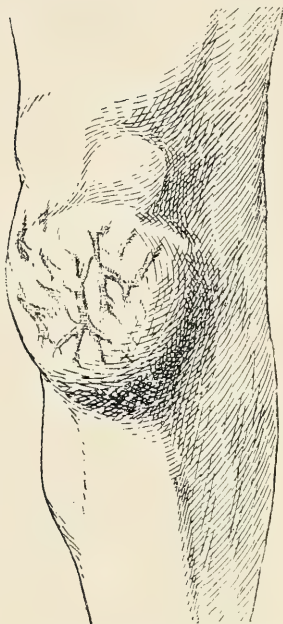


Fig. 1033. — Again an osteo-sarcoma of the tibia; tumour very easily delimitable, in a large mass, a venous network "like the head of Medusa" over the surface of the tumour. Situation epiphysal rather than diaphysal; the onset and development are different, etc.

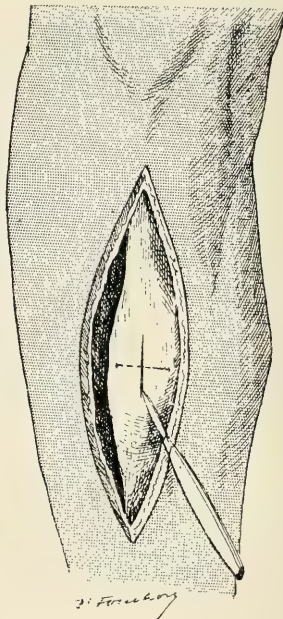


Fig. 1034. — After incision of the soft tissues, one comes upon the periosteum raised by the pus (see fig. 1028); crucial incision of periosteum. After which raise the edges and drain.

You will guard against all immediate trephining, in spite of your having probably heard set forth the necessity for trephining in all cases. Well, no, this is not necessary here, and besides, it is not harmless.

1st. *Trephining is not always necessary.*

I have cured a very large number of cases of osteo-myelitis by incision only of the soft tissues and the periosteum, *without trephining the bone*.

2nd. *It is not harmless.*

For the hole, or holes, made in a sound bone are filled up with great difficulty and may cause obstinate fistulae which are liable to be infected; and this risk is much greater here, where the vitality of the bone is compromised by the disease.

The danger is further increased by the wide detachment of the periosteum and the scraping of the medullary canal which many surgeons do at the onset, *as a matter of routine*, for all cases of osteo-myelitis without exception. For all these reasons, I consider that, by immediate and very wide trephining of the bone, one encourages ulterior necrosis.

Therefore, in these cases, do not trephine at the outset. But it goes without saying that you will be on the watch. If, two or three days after the incision into the soft parts, the temperature has not fallen, and if the persistence of the fever cannot be attributed to a new focus which has appeared elsewhere, but rather to a retention of pus in the medullary canal — then, yes, you will trephine the bone, — but that will happen certainly not once in five times in osteo-myelitis of the first form, that is, more than four times out of five you will be able to produce evidence that you have saved these patients from fistulae in the bones, which are always serious and very often interminable.

2nd. *form.* — **Very acute osteo-myelitis.** Here we have a general intoxication of the organism: fever of 40°, prostration, insomnia, low delirium, urine scanty and containing albumen.

In such a case, the vital indication over-rides everything. The danger is pressing, it is necessary to neglect nothing which will diminish it — and to proceed without delay. The stage of development of the local incidents matters little, **you will intervene as a matter of urgency**, immediately, as soon as

you know which bone is affected, you will proceed at once to open the medullary canal.

One incises the periosteum in the crucial manner by two incisions of 4 cm. each; one raises the flaps and **one tre-**

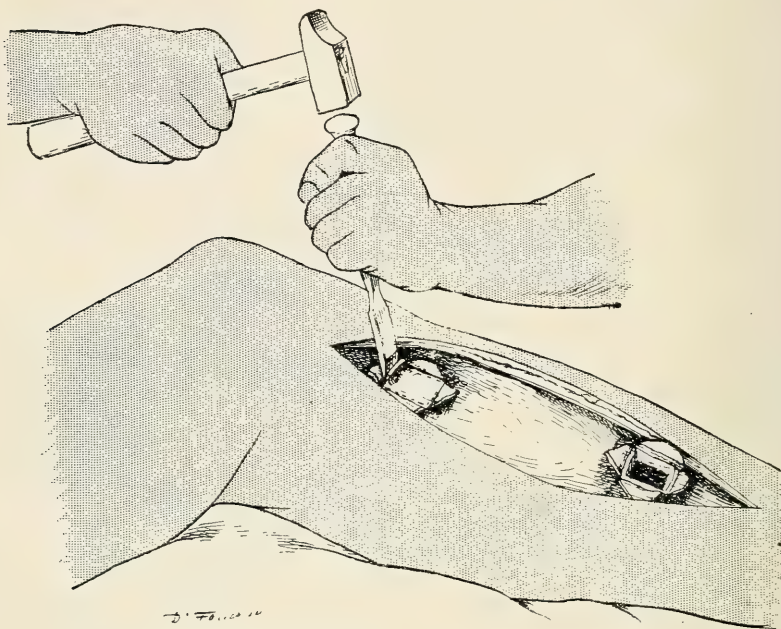


Fig. 1035. — Sub-periosteal trephining at the two extremities of the focus; the periosteum having been incised and raised previously, at the two places only where one uses the chisel; the part lying between the two openings is not detached. In order to perform this, put on the Esmarch's trephining bandage beforehand; it facilitates the work and has no inconvenience notwithstanding what has been.

phines; in order to make a safety valve, one makes an opening one and a half centimetres in diameter.

This is how it is done : with a chisel and a good mallet, one marks out and raises a square of bone of these dimensions (fig. 1035).

Do not curette the marrow : for, under the pretext of removing all infected particles, one causes bleeding, or sets

up inoculation, or compromises the nutrition of the bone.

There is a flow of dark blood streaked with pus from the opening made in the bone. If the flow does not seem to be sufficient with one opening, do not hesitate to **make a second** at 8 centimetres above and below; between the two, on the bridge of bone which separates them, one preserves the peri-

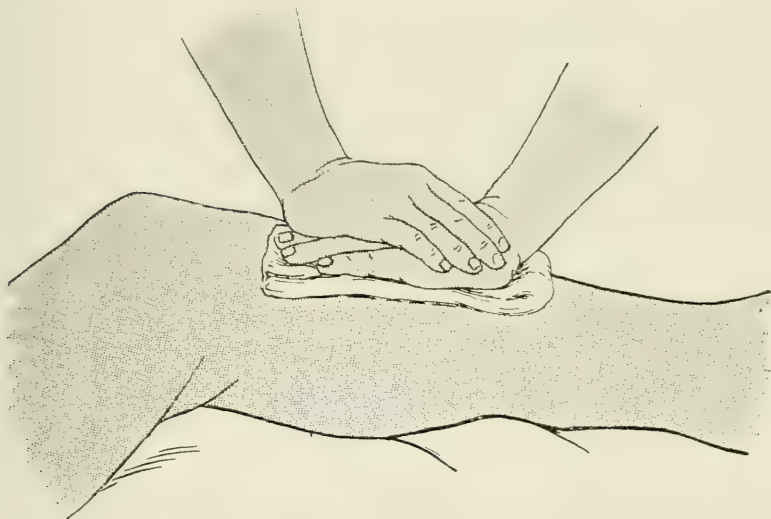


Fig. 1036. — Arrest of hæmorrhage on removal of the Esmarch bandage, the two hands making pressure over the whole extent of the wound. The compression should be kept up for ten minutes. After that, mop the part with a tampon of sterilized gauze. Suture the skin partially and apply a light compressive dressing with 2 Velpeau bandages.

teum, one takes care not to denude it, contrary to what is done by some surgeons; it is true that the periosteum is often detached of itself in such cases.

With a small aseptic syringe, pass a stream of sterilized water or a warm solution of sublimate from one opening to the other, to make sure that the track is permeable; place in it two small drains, and that is all (fig. 1036)¹.

1. If there is pus in the joint (which is rare) one drains it thoroughly (v. Drainage of Joints, Chap. vii).

No immediate resection of the diaphysis. — If I tell you this, it is because some do not fear to resect under the pretext that the bone may become necrosed afterwards, but that is wrong because :

1st. One cannot be certain, even in the worst looking forms, that the bone will become necrosed¹.

2nd. One cannot, by local examination², distinguish *certainly*, in a moment, the bone which is going to die; and one would be acting blindly, in saving perhaps that which is doomed to necrosis, and removing that which may live.

Therefore, for the time being, simply trephine.

If cicatrisation does not occur for a few months afterwards, we enter then the condition of chronic osteo-mylitis, of which we will now speak.

II. — The Treatment of Chronic Osteo-mylitis.

This presents itself with one or several fistulæ (see fig. 1037 and p. 970 for the diagnosis).

A fistula existing for several months is an almost certain sign of the existence of a sequestrum. One ought to set about finding it, but it is necessary **to wait 5 months** after the preceding operation, because **dead bone takes about 5 months to separate** from living bone.

One goes by the cutaneous fistula down to the hole in the bone.

1. Even were one sure that this fragment (comprising the whole thickness of the bone) were going to necrose, it would not be necessary to remove it immediately, for it will serve, for some weeks, as a direct support for the new bone which is in formation (v. fig. 1040).

2. One has only probabilities more or less great from this point of view. If the denuded plate of bone does not cut with the colour of the neighbouring bone, if the plate remains of a rosy white and preserves (by small vascular tufts) its attachment to the periosteum, it is very probable that it will live; if, on the contrary, the osseous plate is dullish white or *greenish white*, cutting with the colour of the neighbouring bone; if it is entirely separated from the periosteum over a large extent, without preserving the least attachment with it, it is very probable that it will necrose. —

One distinguishes then, very easily, the dead bone from the new and living bone, which is rough, irregular, exuberant, reddish, dotted with bloody points, whilst the dead bone is



Fig. 1037. — Chronic fistulous myelitis of the tibia. The bone is irregular, bossed, hypertrophied over a large extent; fistulae and adherent cicatrices. Diagnosis with tuberculosis: 1st. by the mode of origin of acute symptoms in osteo-myelitis; 2nd. by its seat, being rather diaphysial; 3rd. by hypertrophy of the bone in osteo-myelitis and its atrophy in tuberculosis.

very smooth, of a dull white or yellowish colour, recalling old ivory (v. fig. 1038 and following).

1st. Sometimes the sequestrum is on the surface of the new bone, and it will come away alone, or one can easily remove it (fig. 1039).

2nd. Sometimes a sequestrum occurs in the medullary canal

(v. fig. 1040, 1041 and 1042); it points through the opening, one sees it, or it is easy, with a forceps introduced into the canal, to find it; if it is awkward to seize hold of, one enlarges the orifice with the chisel and a few taps of the mallet.

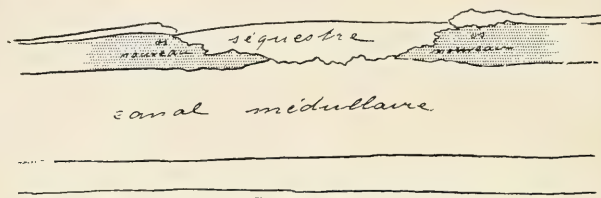


Fig. 1038. — Sequestrum formed like a "segment of a ferrule". One sees the hypertrophied periosteum producing new, living bone.

3rd. Sometimes it is encased in the new bone like ore in the flinty veinstone (fig. 1043).

In the third case, one is obliged to divide one or several



Fig. 1039. — The rugine is pushed under the sequestrum at its angle and one tries to loosen it by lever-like movements.

small bridges in order to disengage the sequestrum; but do not try to remove it unless it is distinctly detached from the living bone, or at least, that the separation is already begun. If not, do not persist, drain the wound and wait a few months until this spontaneous separation becomes an accomplished fact or nearly so.

In the absence of a sequestrum, take care that you do not

remove the periosteum very extensively from the almost entire diaphyses, by creating deep hollows and curetting them *within and without*¹.



Fig. 1040. — Sequestrum of the diaphysis in the form of a ferrule, entirely enclosed. The sequestrum has served as a support for the new bone, directing its development.

Limit yourself to draining the suppurated focus, but drain sufficiently to assure the complete apyrexia of the patient;

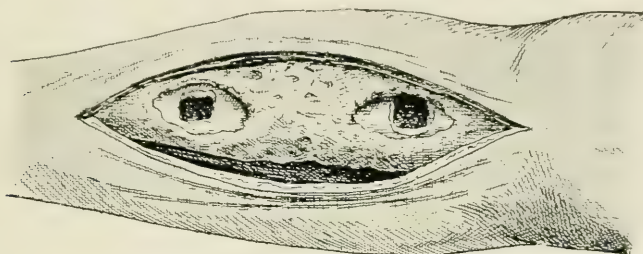


Fig. 1041. — Long standing osteo-myelitis; 5 months after the first operation, one again opened up the wound; one found the old bone, necrosed, white, and smooth, shewing still the two trephine holes, sheathed in new and living bone; the latter is irregular in shape, reddish, rugose, exuberant.

The periosteum is not detached in the space between the trephine holes.

if not, look out for renal infections, albuminuria, and for irremediable secondary visceral degenerations.

1. Exceptionally, **in the absence of any fistula**, the indication for operation in **chronic osteo-myelitis** may be a **very acute pain** producing weakness, a pain which persists in spite of rest. In that case, one trephines the point of bone where the maximum of pain is situated; there is nearly always hypertrophy and expansion of the bone tissue at this point.

One trephines at this point to discover if a sequestrum exists there (fig. 1044) or, may be, an abscess.

One sometimes observes at the same time, in the absence of both sequestrum and abscess, that the removal of bone by trephining has cured the patient of his acute pains.

In such particular case, it may be that you have not happened to find a sequestrum distinctly formed and *detached*;



Fig. 1042. — One mobilises, and withdraws with the forceps the fragments of sequestrum (after having, if need be, enlarged the openings already existing).

there is, in fact no sequestrum, and the bone is *diseased* “*en masse*” and uniformly at all points.

In that case there is nothing to be done; one must wait.

trajet fistuleux

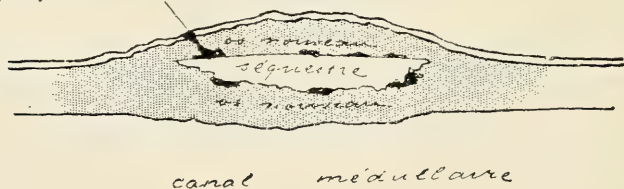


Fig. 1043. — Sequestrum encased in an expanded part of the new bone which is living and ought to be resected only sufficiently to allow of removal of the sequestrum.

Alas! it will be necessary sometimes to wait a long time, three years, five years, eight years, for a cure of these very bad cases of osteo-myelitis which go on for ever.

One must accept the situation and learn to abstain.

For the trenches cut in all directions and the lateral resec-

tions of the diaphysis, which some surgeons make in these cases where they have not found a sequestrum, without doubt for fear of appearing nonplussed, all that, I say, would not ensure the life of the bone, the vessels of which are strangled by the osseous proliferation which has occurred in the Haversian canals.

It is necessary then, to abstain and leave these patients to live with their fistulæ when they are not too uncomfortable. Do not forget that the fistulæ may nevertheless close spontaneously, even after five, ten, fifteen years, when one dares no longer hope.

It may however happen, under exceptional circumstances, that the suppuration is so abundant and the pain so distressing, that the patient himself demands amputation, which remains, in fact, the only remedy.

Resumé and Conclusion.

A. — *Acute Osteo-myelitis*

1st. Ordinary form. — The fever is below $39^{\circ}5$: one must not trephine the bone at once, but incise the soft tissues and relieve the periosteum.]

2nd. Acute form. — When the fever oscillates around 40° , one trephines the bone at once, but without resecting the diaphysis, because one cannot, at this moment, distinguish whether the bone is doomed to necrose, or is likely to live.

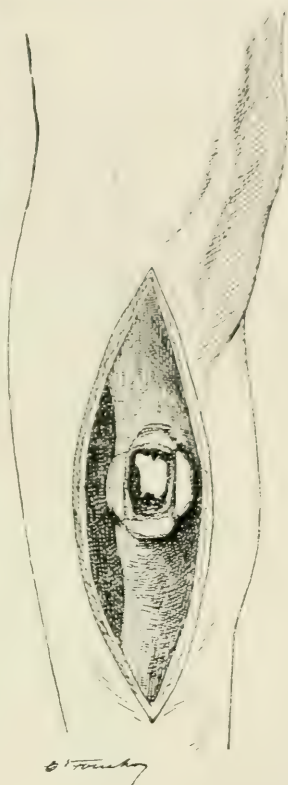


Fig. 1044. — The periosteum is incised and turned aside on a level with the "expansion" or at the seat of the maximum pain; the new bone is attacked minutely with the gouge which finishes by exposing the sequestrum... or an abscess.

B. — Chronic Fistulous Osteo-myelitis.

The treatment consists in looking, every five months, to see if there is a sequestrum which can be removed (fig. 1035).



Fig. 1045. — David B., Rothschild Hospital; multiple fistulae on the arm and complete necrosis of the humerus, of the right ulna and radius, after particularly severe osteo-myelitis. — I performed ablation of the three necrosed bones (from the shoulder to the wrist) that is, **entirely deossified the arm and forearm**. The operation took place six months after the onset of the acute symptoms.

Four months after the operation, a **new humerus had formed**, obviously the same length as the normal humerus, but the periosteum of the forearm has reproduced only a short osteo-fibrous and slightly solid twig. Nevertheless, such as it is, the arm fulfils almost the normal functions. — The arrow indicates the site of the new articulation of the elbow, which has only, it is true, a play of from 15 to 20 degrees.

If one does not find a sequestrum, there is nothing to be done but to wait, draining and preserving asepsis.

CHAPTER XXIII

A SIMPLE WORD UPON THE DIAGNOSIS OF CHRONIC OSTEITES AND ARTHRITES

A. — *DIAGNOSIS OF A CHRONIC OSTEITIS*

I. — **Non-suppurated Arthritis.**

a. *Traumatic?*

Patients will often speak to you of an accident (a fall or a blow).

Do not be content with this diagnosis, if the osteitis has continued for several weeks, — if, in spite of the date assigned to the traumatism, the lesion remains stationary, and especially if it progresses.

This chronic inflammation of the bone will be :

- b. *Tuberculous*, very often, 9 times out of 10 (see fig. 1046);
- c. Or *Syphilitic*, once in ten times (fig. 1050);
- d. *An Osteo-sarcoma*, very rarely, perhaps once in a hundred times¹ (fig. 1048).

The diagnosis of **syphilis** and of **tuberculosis** has been discussed in Chap. xxi, to which I refer you.

The diagnosis of **osteo-sarcoma** is generally very easy with radiography (v. fig. 1048). — In default of the X rays, be guided by the relatively rapid increase in volume of the bone. — which may be doubled in scarcely 3, 4, 5 months. — One has sometimes the sensation of periosteal masses, fungating, and giving

1. *Osteo-myelitis* (fig. 1047) may give rise to chronic osteitis which is not at present suppurating, but which has been, and one finds traces of this old suppuration. There is also the history : acute onset, etc. (see the preceding chapter and fig. 1047).

Wishing to remain practical, I do not speak of those other processes capable of causing chronic osteites, because you will very probably never see them, for instance : osteo-myelitis chronic from the beginning, hydatid cysts of bone, etc.

a **false fluctuation**. One often believes even that there is a collection of fluid, and there is no objection, in making sure of this, to an exploratory puncture, when only blood will be found in the case of sarcoma. The swelling may be vascular to the extent that it conveys pulsations which have led to its being mistaken for aneurism. — On the other hand, one feels on palpation, a parchment-like crepitus as if one were breaking small fragments of bones¹.

II. — Suppurated Osteitis and Fistulous Osteitis

a. If it is a question of *chronic suppurated osteitis*, but *unopened* (that is, if there is a cold abscess) it is due to *tuberculosis* in 9 cases out of 10, or to *syphilis* in one case out of ten (v. Chap. XXI, the diagnosis between the two).

b. If there are *one* or **several fistulæ** it may be, it is true, tuberculosis or syphilis, — but it may also be an *osteo-myelitis*, in which case one has the antecedents, the history of an acute or very acute onset; the bone is hypertrophied “*en masse*”, enlarged and hardened (v. fig. 1047); from time to time small splinters of bone are discharged by the fistulous openings.

1. How to distinguish a **syphilitic** sabre shaped **tibia** from a **rachitic** tibia or one affected with **osteo-myelitis**? One is helped by the history, by the antecedents—and a general examination of the patient. Further :

a. In *syphilis* : there is the shape of the bone, which is enlarged but not twisted (fig. 1050); in *Rachitis* under the X rays one sees the medullary canal preserved, whilst it is filled up in *osteo-myelitis*.

b. As to *Rachitis* : the *twisting of the bone* and the thickening of its extremities; other diaphyses are bent, etc. (fig. 1049).

c. As to *osteo-myelitis* : the hypertrophy of the bone is very irregular (v. fig. 1047), there are traces of old suppuration, cicatrices adherent to the bone, etc.

A *propos* of *Rachitis* and *Syphilis*, we may remark that, according to Marfan, syphilis in the parents may produce of itself — exceptionally — true rachitic lesions; for instance, in children nursed at the breast under the best hygienic conditions. In that case, the rachitis is earlier in appearing (in the third or fourth month) when it is due, as it generally is, to digestive troubles. Further, the natiform cranium is especially the sign of hereditary syphilitic rachitis. Lastly, one has on the one side the syphilitic antecedents of the parents, on the other hand the absence of causes of the digestive order present in ordinary rachitis.

B. — *DIAGNOSIS OF A CHRONIC ARTHRITIS*

I. — **Suppurated and Fistulous Arthritis.**

a) **Arthritis with formation of pus but not opened.** —

It is nearly always *tuberculous*, and sometimes *syphilitic*.

b) **Fistulous Arthritis.** — This will generally be *tuberculosis* — rarely *syphilis* or *osteo-myelitis*.

The elements of diagnosis are here the same as for chronic osteitis (see above).

II. — **Arthritis not suppurated.**

Patients will mention here again either *traumatism* or *rheumatism*. If the **traumatism** has been very slight or next to nothing, or if it dates back several weeks — and if the symptoms persist or increase, in spite of massage, think of some other cause than traumatism.

Rheumatism. — In the same way **be suspicious** above everything, of those **monarticular rheumatisms which continue** for months, in spite of appropriate treatment, salicylate of soda, etc., etc. It is not rheumatism, look for something else.

Idem, be suspicious of **hydrarthroses** which go on indefinitely.

It is a question in these cases of : a. *Tuberculosis*, generally ;

b) *Syphilis*, sometimes ;

c) Think also of *osteo-sarcoma*, though it is very rare ;

d) Of an *osteo-myelitis*? — Yes, this may produce arthrites which are no longer suppurating though they have been suppurated at some time. The diagnosis is by means of the history, the cicatrices, etc.¹.

The elements of these different diagnoses are the same here as for the chronic osteites (v. above, p. 969).

e) Think of *Polyarthritis deformans*. The diagnosis is made by the multiplicity of the joints affected, the enlargement of the small joints, the slow onset, the sub-acute outgrowths always painful, rarely accompanied by fever (Robin).

1. Further, in the case of *osteo-myelitis*, the whole region, because of the *sclerosis of the soft tissues*, has a hardness equal to wood.

f) Of *blenorragia*. — In the adult, always think of it. But the onset has been acute, and interrogation and examination of the patient reveals the existence of the gonococcus.

g) Of *tubes*; — But in this case, there is a dislocation or a crumbling away of the extremities of the bones, sometimes transformed into a “**bag of nuts**”; the joints themselves more or less

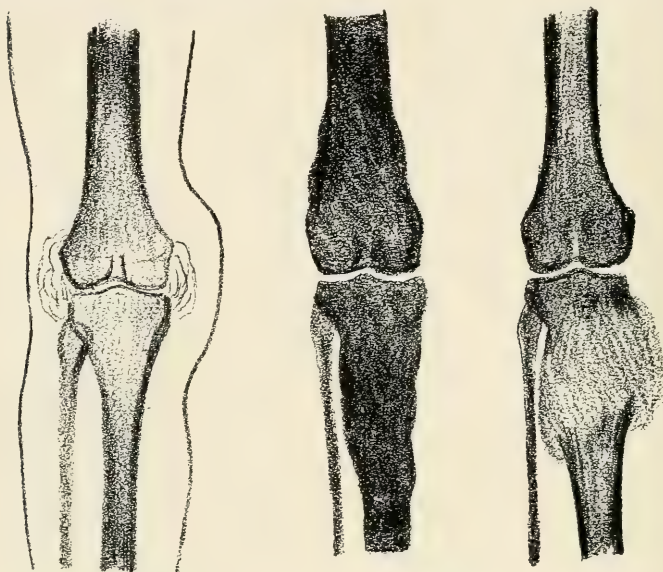


Fig. 1046. — *Tuberculosis* ;
atrophy of bone.

Fig. 1047. — *Osteo-myelitis* ;
enlargement club-
like and hard.

Fig. 1048. — *Osteo-sarcoma* : enlarged in
club form and rarified.

flail-like and sometimes luxated. **Absence of pain** almost absolute, even in the case of very advanced lesions. This is peculiar. Further, positive signs of ataxy, revealed by a general examination.

h) *Dry arthritis* is recognised by crackling in the joints; — the patient suffers less in walking than when at rest, etc. — General examination of the patient.

i) In *varicose conditions*. — Notice the chronic arthritis (swelling, hydrartoses, etc.), which one finds very often among these patients, without any other cause than the troubles in the

circulation caused by the varices. Treat these, and the articular phenomena will disappear.



Fig. 1049. — *Rachitis* : **twisting** and **nodosity** of the epiphyses.



Fig. 1050. — *Syphilis* : **expansion**.

j) Arthrites consecutive to *eruptive fevers*, especially *scarlet fever*. The diagnosis is by the history, etc.

Do not forget that the eruptive fevers and especially measles, open the door to tuberculosis, and very often leave behind **true tuberculous arthritis**.

CHAPTER XXIV

SOME DEFORMITIES OF THE HAND AND FINGERS

1st. — CONTRACTION OF THE PALMAR APONEUROSIS

(or, Dupuytren's disease : fig. 1051 and 1052.)

Treatment. — To produce a desirable result, it is necessary to operate upon, not only the palmar aponeurosis (excising it),



Fig. 1051. — Contraction of the palmar aponeurosis (secondary contraction of the flexors of the two last fingers).

but also upon the contracted flexor tendons (elongating them), in spite of the fact that the tendinous contraction may be secondary.

1st step. Incision of the skin. — One surrounds by two incisions in the shape of a V, with it's apex above the margin of the contracted area of skin (fig. 1053).

2nd stage. One **dissects off** the skin, separating it very

minutely and very slowly, by slight cuts of the bistoury or of the scissors, from the aponeurosis, to which it is closely adherent.

3rd step. One **surrounds**, by incisions "*en trapèze*" the contracted and sclerosed **segment** of the **aponeurosis**, *proceeding with caution*, so as not to injure the vascular and nerve branches lying beneath.

One **excises** the area of aponeurosis thus delimited, by cutting the fibrous expansions, which are spread over the sheaths of the tendons.

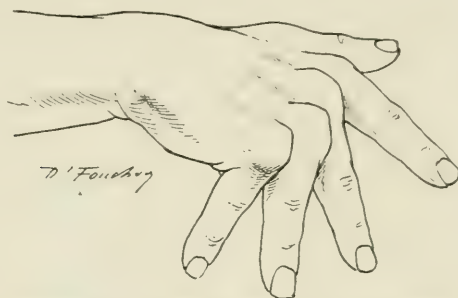


Fig. 1052. — Contraction of the palmar aponeurosis: impossibility of performing extension of the fingers.

4th step. **Lengthening the tendons** (fig. 1054). — One lengthens, by dividing, the two flexor tendons (superficial and deep) of the finger or fingers which are contracted.

Follow the procedure described for lengthening the tendo Achillis (v. Chap. xiii).

One attacks the tendons towards the middle of the hand, above the point where the superficial tendon divides into two bands — commencing by splitting the deep flexor.

The difference in level of the two transverse hemisections is calculated according to the degree of flexion of the fingers. This calculation is made on the same bases as for the tendo Achillis (v. Chap. xiii).

The fingers carried in extension, or even hyper-extension, the skin is sutured with catgut in the manner represented in

fig. 1055 and the correction is maintained by a plaster, which is left in position for three weeks.

It is necessary to closely watch the circulation and the innervation of the fingers : to do that, one uncovers the pulp of the fingers and make certain, morning and evening, that the patient can feel the prick of a needle.

In order to facilitate this in-

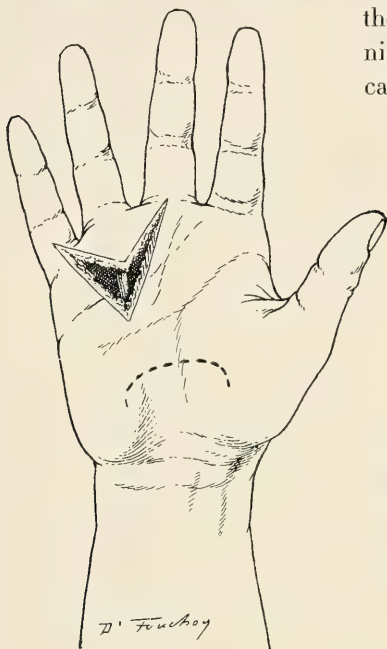


Fig. 1053. — One has already incised the skin, in V shape, and excised the contracted aponeurosis. The fingers are noticeably elongated, widening the lips of the wound. In dotted lines is the superficial palmar arch.

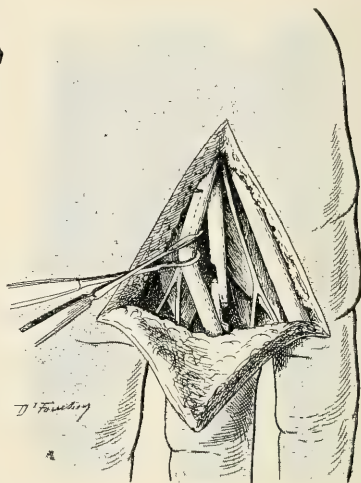


Fig. 1054. — The tendons are exposed; the perforating or deep tendon has been lengthened, after having turned aside the perforated or superficial tendon; the latter is lengthened in its turn by an identical proceeding.

spection, and to *prevent all risk of sloughing over the fingers* at the points pressed upon, it is wise to exchange the immovable plaster for one bivalve (fig. 1056).

The bivalve is prepared the day after the operation.

It becomes very easy to control (every day or every second day) the condition of the fingers : on each occasion one pads, if

necessary, the plaster opposite any suspected points, — after which the two valves¹, are again placed in position.

After the three weeks required for the cicatrisation of the tissues, manipulations and active and passive exercises are commenced, to render the hand and fingers supple.

In the interval of the exercises, the hand is replaced, if necessary, in the plaster bivalve.

2nd. CONTRACTION OF THE FINGERS

I have observed several times, in young girls, this *essential* contraction, that is, contraction of the fingers without appreciable co-existing contraction of the skin or of the palmar aponeurosis.

a) The *mild and recent case* : the hand is massaged, malaxed, redressed once or twice a day, and after each manipulation is supported by two wooden splints (padded with wool) one dorsal, the other palmar (fig. 1058).

b) The *serious and old case* : the superficial and deep flexor



Fig. 1055. — Suture of the skin, altering the V into Y.

1. Recall what we have said *à propos* of plasters for club foot, namely, that one may avoid sloughs by being careful not to add anything to the correction, once the plaster bandage has been applied.

The plaster ought to do nothing else but preserve the correction previously obtained by surgical operation or orthopædic manœuvres, that is, one should not expect it to be a supplement to correction.

tendons will be lengthened, by hemisection after the manner



Fig. 1056. — Plaster bivalve seen on the radial surface, two shells, one palmar, one dorsal, which are joined together afterwards with a soft bandage.

described above, and supported afterwards as explained.



Fig. 1057. — “Essential” contraction of the flexor tendons of the fingers; the first phalanx is in hyper-extension, the other two flexed.

If you find the first of these treatments too confining and of

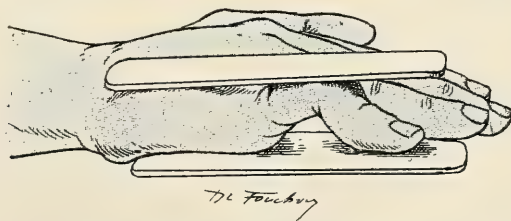


Fig. 1058. — Two wooden splints (padded with wool) are placed on the dorsal and palmar aspects of the fifth finger; they reach up to the carpus; a bandage approximates the one to the other. Look at it twice a day in order to avoid sloughing.

little practical use to you, and if the second does not appear to

you likely to be accepted, because it requires a surgical operation, you will make a forcible redressment of the deviation by simple orthopædic manœuvres in several stages, being guided by what we have said as to the redressment of club foot (Chap. xv).

The forcible redressment may be made either *without chloroform*, in 7 or 8 sittings, at the rate of one per week, each sit-



Fig. 1059. — “ Symptomatic ” contraction involving the middle finger; the sheath of the flexor tendon is swollen, bulging into the palm of the hand; the first phalanx is very much increased in volume on the palmar surface.

— It is caused by *fungous synovitis with rice shaped grains* (v. p. 920).

ting being very gentle and kept up for ten or fifteen minutes, and followed by the application of a plaster.

The correction is obtained in this way in two or three months.

Or *under chloroform* in two sittings, by vigorous manœuvres of brassage continued for a quarter of an hour : the second sitting from 15 to 20 days after the first, gives the correction (or rather the hyper-correction) in about six weeks.

In both cases, the consecutive treatment by massage, exercises, and retention in a plaster bivalve ought to be prolonged for months, at least six, without which one runs the risk of seeing the deformity reproduced.

What I have said refers entirely to the “ *essential* ” contraction of the fingers, often hereditary or running in the family,

but it should not be applied to “*symptomatic*” retraction of tendons in tuberculosis of the synovial sheaths (fig. 1059).

The diagnosis of symptomatic contraction is made by the age of the patients being generally less advanced, by the antecedents of tuberculosis, by the fact that the tendons are *thickened* and *globular* (instead of being distinctly detached in delicate cords as in essential contraction); the thickening forms in places even pseudo-fluctuating bulbs, of the size of a nut, whilst the bulb sometimes observed in essential contraction is as small in volume as a lentil and of the consistence of a wart. An exploratory puncture made in these swellings produces, in the case of symptomatic contractions, a serous liquid with or without rice shaped grains.

The diagnosis is important, for one must not incise in such a case — but puncture and inject (one does not attend to the redressment until after one has cured the tuberculosis), whilst in essential contraction, one may lay it open at once in order to perform hemisection of the tendons.

CHAPTER XXV

SOME DEFORMITIES OF THE FOOT AND THE TOES

1°. — TALIPES EQUINUS

Should you have to treat a deformity or deviation of the foot, it will be sufficient to remember what we have said in Chap. xiii and xv, upon the treatment of the deviations of infantile paralysis and congenital club foot.

Let us take, for example, *Talipes equinus*, because by the side of **talipes calcaneus** exists as you know a **talipes equinus** often complicated with *varus*.

In both varieties of hollow foot, it is a question (much more often than of congenital malformations) of acquired deviations, consecutive to limited infantile paralyzes.

Their **treatment** presents one common indication, namely, to stretch the plantar aponeurosis, which is contracted in both cases.

The course to take with regard to the tendo Achillis differs altogether, seeing that in *talipes calcaneus* one ought to shorten the tendon, and, on the contrary, lengthen it in *talipes equinus*.

Lastly, when the great toe is pulled upwards, which is frequently the case, one ought to lengthen also the proper extensor of this toe.

How are we to fulfil these different indications where *talipes equinus* is concerned?

One can do it in two ways : either by simple orthopædic manœuvres — or by section of the tendons or aponeuroses.

The better way is to combine the two methods : one obtains in that way the most perfect and lasting result.

Thus :



Fig. 1060. — Talipes equinus. — 3 factors of deviation : contraction of the tendo Achillis, contraction of the plantar aponeurosis, and contraction of the proper extensor of the great toe.

Cast your eyes on fig. 1060 and 1061 ; they shew you that the deformity of talipes equinus is made up of three principal elements :

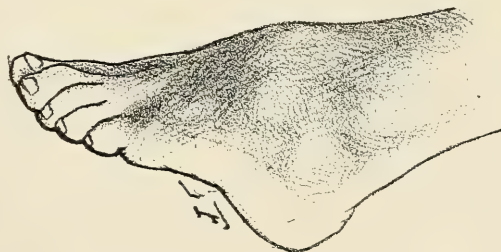


Fig. 1061. — Here is the foot of a Chinese woman (from a photograph), it is almost the deformity of a talipes equinus.

- 1st. The elevation of the heel ;
- 2nd. The contraction of the plantar aponeurosis ;
- 3rd. The raising up of the great toe.

a) In order to overcome the first factor, that is, in order to **bring down the heel**, one divides the tendo Achillis, if there

is not more than a centimetre and a half in length to be gained, and that is most frequently the case (v. p. 674); or one hemisects the tendon (v. p. 676) if there is more than a centimetre and a half to be gained.

b) In order to **redress the vault**, one divides the contracted plantar aponeurosis.

c) To **lower the great toe**, one divides the tendon of it's own proper extensor.

Technique of Section of the Plantar Aponeurosis.

The section is performed by the sub-cutaneous method.

Should you wish to remain as far as possible from the plantar

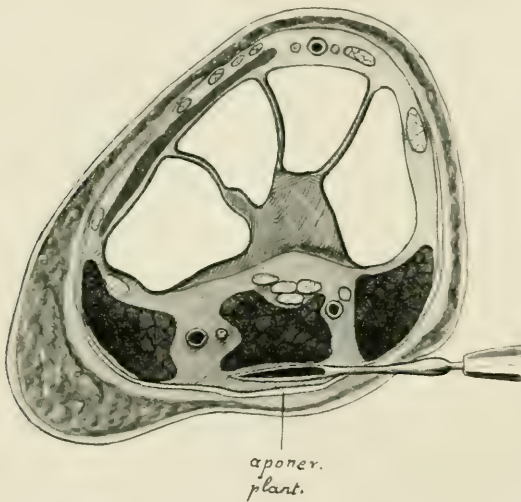


Fig. 1062. — One sees by this section, made at the middle part of the foot, that at this level, the aponeurosis is so far from the vessels that there is no risk of their being wounded, provided that one proceeds carefully.

vessels, divide the aponeurosis at the root of it's insertion into the os calcis.

And this has been done in this way. But there is a risk of not reaching the principal strands of the aponeurosis.

It is more advantageous to make the section opposite the middle part of the foot, that is, at an equal distance between the heel and the toes (v. fig. 1062).

At this level, one obtains the maximum of useful effect, and the aponeurosis is found so far removed from the plantar vessels

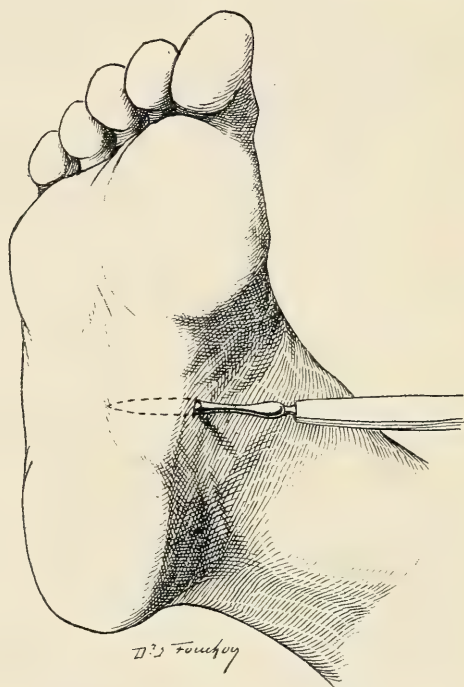


Fig. 1063. — The tenotome penetrates a little behind the middle of the internal border, it finds its way under the deep surface of the aponeurosis.

and nerves that one has no fear of wounding them, at least without a distinct slip of the bistoury or of the tenotome.

But there is a simple and sure method of avoiding all mishap, that is, to divide the aponeurosis from the deep to the superficial surface.

The patient being laid face downwards, an assistant holds the foot in the ordinary position (neither flexed or extended).

One pricks the skin with the pointed tenotome opposite the middle of the internal border, if it is the left foot, of the external border, if it is the right foot, and one penetrates gently, holding the instrument horizontally.

One has traversed the skin and the aponeurosis when the ins-

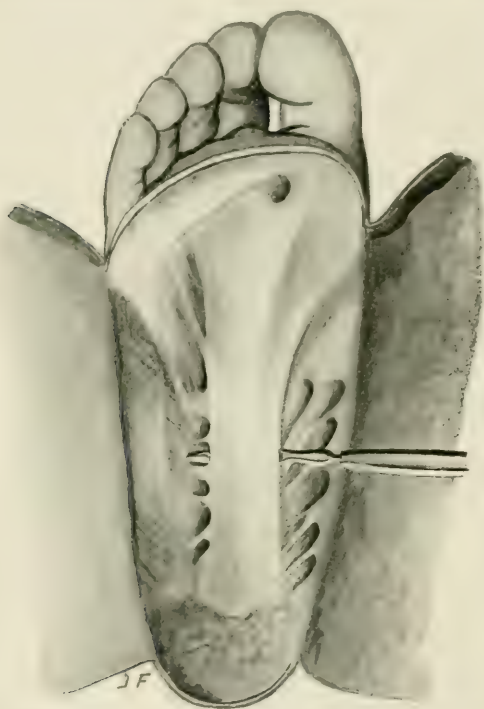


Fig. 1954. — When the end of the tenotome has reached to one third of the external border of the foot, one turns it round from behind forwards so as to cut the aponeurosis which is put on the stretch by the assistant raising the fore-foot. One cuts gently, so as not to damage the skin by a slip of the tenotome.

trument is pushed in about three quarters of a centimetre: then one travels horizontally and parallel to the skin, between the aponeurosis and the muscle, to nearly the opposite border of the foot.

At this moment, one replaces the pointed tenotome by a blunt one, and turns the cutting edge towards the skin.

Then, the assistant stretches the aponeurosis, by pulling on the fore-foot and on the heel, with his two hands; he pulls at first gently, then more vigorously. The aponeurosis stretched in this way is brought against the cutting edge.

The operator and the assistant who pulls ought, both of

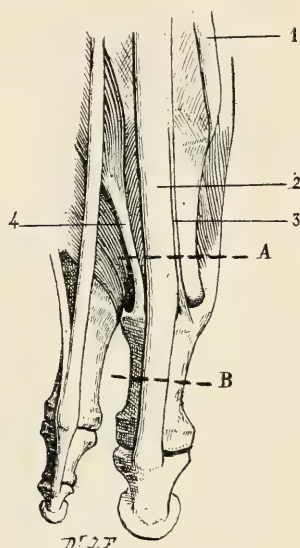


Fig. 1065. — If the section is made over the middle of the first phalanx of the great toe at B, it will only involve the proper extensor of the great toe (2), if it is made at a centimetre and a half behind the metatarso-phalangeal articulation at A, it touches (as well as the extensor) the central part of the aponeurosis (4) and the two lateral expansions of the extensor tendon, which are inserted on each side of the posterior extremity of the first phalanx (3).

them, to proceed with method and attention in order to take care of the skin, which will split from one end to the other if they are rough.

(Should this happen do not be alarmed, this opening in the skin, if it is ever produced, is not really serious). One is informed at each step, I may say, at each millimetre gained, as to the progress of the section and of the correction : 1st. by slight jerks produced by the rupture of each important aponeurotic

band, 2nd, by the more and more marked obliteration of the plantar concavity, and 3rd, by the easy proof made that the cutting edge has approached the skin.

When the integument is reached, you stop and withdraw the tenotome.

If there still remain aponeurotic strands, you will break them by pulling forcibly upon the fore-foot and the heel. If, quite unusually, they do not give way by these efforts, you will again introduce the tenotome, passing it beneath so as to attack and cut them as you did the main part of the aponeurosis.

By proceeding in this way, you will never have an accident. If you have, by inadvertence, scratched through or even torn through the skin, it is nothing. I repeat, you will not have occasion to suture it; protect the foot with a sterilised compress and make firm pressure to arrest any bleeding — so as to pass on, as if nothing had happened, to the orthopedic manœuvres which should complete the correction.

The divided skin is repaired under the plaster, without there being any need to look a tit: it is, however, easy to do so, without removing the plaster, it is enough to make an opening over the part, and you can thus inspect it every day until it has cicatrised.

Section of the Tendon of Great Toe.

Finally, to bring down the great toe, one divides by subcutaneous section, the body of the tendon of the proper extensor over the middle of the first phalanx. One preserves thus the expansions of the tendon, which are inserted on each side of the posterior extremity of the first phalanx (v. fig. 1063).

For this section, contrary to what has been advised for the preceding, you will make your cut from the superficial to the deep surface.

In proportion as you carry out the three sections (section of the tendo Achillis, section of the plantar aponeurosis and section of the tendon of the great toe) you will ensure the arrest of hæmor-

rhage by compressing each new small wound with squares of gauze or tampons.

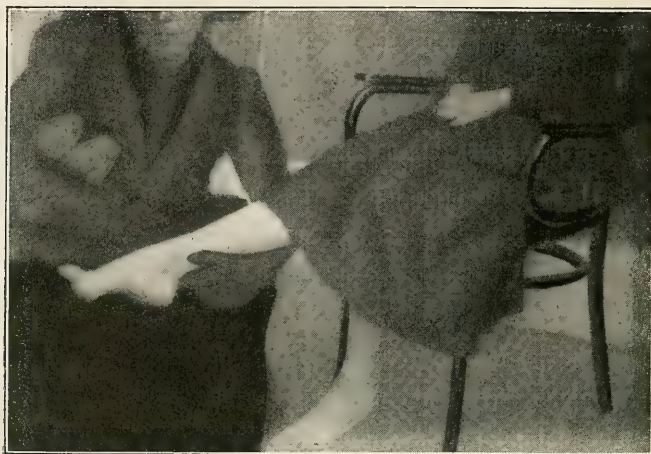


Fig. 1066. — Talipes equinus.

When all the sections are complete, you will grasp the foot



Fig. 1067. — The same, 3 months after treatment. — We have here lengthened the tendo Achillis and divided the plantar aponeurosis and the tendon of the proper extensor of the great toe.

(well protected with an aseptic compress) and proceed, by ener-

getic traction, in the appropriate directions, to the achievement of the correction.

One breaks down in this way anything which resists. And even when the tenotome has cut only part of the plantar aponeurosis one succeeds, by vigorous manoeuvres, in breaking down the resistance, now isolated, of the two lateral aponeuroses (internal and external plantar aponeuroses).

One feels the strands progressively torn under the efforts of the hands. And one continues these manoeuvres and tractions until the correction, and, better still, a free hyper-correction to almost 20 or 25° has been obtained.

Then one applies a plaster with the foot in this position of hyper-correction. At the end of from 4 to 5 days, the child is able to walk with the plaster and a slipper.

He walks thus for 3 or 4 months. Then one replaces the plaster with a celluloid boot which will be worn for six months, taking it off each day for a few moments to massage and bathe the foot.

After 6 months, the cure is accomplished. Nevertheless, it is wise to continue the use of the celluloid for a few months longer.

2nd. HALLUX VALGUS

As in club foot, there are here three methods of correction.

1st. *Manipulations* and small moveable apparatus, of which the patterns are numerous. Most of these apparatus have on the inner side a straight plate to which the toe is drawn by small leathern straps (fig. 1070).

2nd. *Surgical operation*, cuneiform excisions of the head of the metatarsal bone, with or without resection of the projecting extremity of the first phalanx.

3rd. *Forcible redressment*, in one or several stages.

The first of these treatments is too long and not very practicable, in that it requires two sittings every day.

The second, in that it involves a surgical operation, is not practicable for the immense majority of practitioners.

I would recommend the third method, namely the **forcible redressment** in one or several stages, with or without chloroform, according to the case.

The deviation is redressed by manœuvres analogous to those for the redressment of club foot. They should be carried up to



Fig. 1068. — Hallux valgus, or deviation outwards of the great toe.

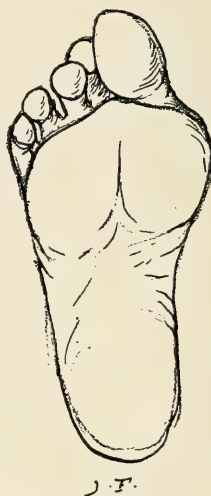


Fig. 1069. — Hallux valgus (viewed on the plantar surface).

hyper-correction and maintained there by a small plaster (fig. 1071).

The plaster should enclose the heel (below the malleoli).

The patient is able to walk with the plaster lodged in a large boot or a sock.

The plaster is left on for two months — then it is replaced by a movable celluloid apparatus of the same shape as the plaster, — afterwards massage, etc.

3rd. HAMMER TOE

In *slight cases*, one performs also forcible redressment, then a small plaster, similar to that figured on p. 924 for the

treatment of spina ventosa, v. Chap. XIV. The plaster should be very well fitting, constructed over a finger of a cotton glove.



Fig. 1070. — Small celluloid and leather apparatus, enclosing the heel.

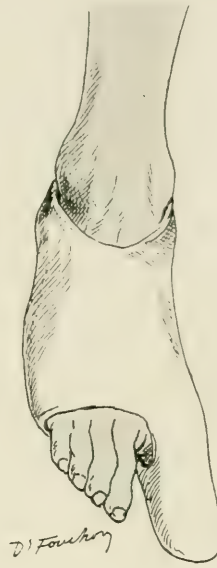


Fig. 1071. — Small plaster (enclosing the heel) to maintain the forced redressment obtained.

In *old and obstinate cases*, the two extremities of the phalanges are resected with cutting forceps — according to the simple technique found described in all the treatises on surgery.

CHAPTER XXVI

ADDITIONAL NOTES

1° ON EXTERNAL TUBERCULOSIS

A. — Is it advisable to operate on External Tuberculosis?

(See p. 204 of this book.)

(An answer to some surgeons who recently tried to bring surgical operations again into favour.)

Truly I thought this question was settled — after all my repeated publications on this subject, which I have studied for a quarter of a century.

I had proved it, in an indisputable way for all those who are not blinded by “routine” or prejudice :

1st. That the formula of 25 years ago, i. e. “that one must or can operate on all external tuberculosis, with the aid of antiseptics” had, in practice, lead to disasters, even in an ideal surrounding such as Berck, as we can show ;

2nd. That the comparison constantly made between external tuberculosis and malignant fistula or cancer is absolutely wrong — since we can cure today, without operation, the most serious external tuberculosis, Hip and Pott’s disease with suppuration ;

3rd. That this healing treatment is applicable everywhere, by all and to all ; for it is simply this :

a). *What is to be done to cure external tuberculosis?* :

Life in the open air (if possible in the country, or on the mountain, or better still at the sea-side) ; rest of the diseased part, immobilisation by well-made apparatus, that is to say, comfortable and well-fitting, modifying injections into the tuberculous focus, with puncture in case of abscess.

b). What is not to be done :

Never open a tuberculous focus (hence no surgical operation). Never open cold abscesses and do not allow them to open spontaneously. No violent redressing (but mild and progressive correction by continuous extension or a succession of plasters).

4th. That this conservative treatment, so simple, cures external tuberculosis, not exceptionally, but always (or nearly always), if it is carefully applied.

At Berck, it succeeds 99 times out of 100, not only among the private patients, but even in our hospitals, either applied by us, or by those of our pupils who follow exactly our methods, as Dr. Fouchet, Dr. Cayre, Dr. Fouchou-Lapeyrade. At the Hôpital Gazin (at Berck) for instance, in 2125 external tuberculosis treated there in ten years, we reckon hardly 22 deaths — 1 per 100.

In Switzerland, on the mountains, our conservative method, without operation, yields 78 per cent. of cures and 4 to 5 per cent. of deaths, which shows already a fair improvement on the results of treatment by operation. And if these results are, as we see, distinctly inferior to those obtained at the sea-side, at Berck, the reason is, doubtless, that the sea-air, charged with iodine, bromine, silica, etc., is, for those diseases, more beneficial than mountain air¹; true—but this comes from the fact also, I am certain, that in Switzerland our methods are not so rigorously applied.

In a word, the first condition to cure an external tuberculosis is to learn to put the bistoury away, for it is the enemy! And the facts were so numerous (by thousands!), they proved so much against the surgical operation, that I believed these conclusions to be definitely and unanimously admitted by surgeons and practitioners alike.

1. This superiority of the treatment of **external** tuberculosis (glandular, articular and osseous) at the sea-side over treatment on the mountains was again quite recently (1912) emphatically affirmed by the Congress of Tuberculosis at Rome.

But what about heliotherapy and altitude? Well, at the sea-side, heliotherapy gives still better results.

« The actinic power of the solar rays », says M. Barbier, doctor at the Paris hospitals, « this actinic power, very great on the summits, reaches its maximum at the sea. »

The sea absorbs the ultra red (caloric) rays, and reflects the yellow (luminous), blue, violet and **ultra violet** rays, which are the chemical or actinic rays whose power as bactericides is now well known.

But I will not insist here on such a subject, wishing to avoid, with the greatest care, anything that may imply a pleading **pro domo**.

This was not so. It was but a truce — followed by a renewed attack of the bistoury on external tuberculosis. During the last year, in the surgical reviews of the highest authority, some surgeons, of Lyons, called us who are conservative in this question, “laggard and reactionary”. They announced to the world that the true doctrine, that which will reign tomorrow, is, thanks to the mask and gloves, thanks to the air pump and to the lead stopping of the bones, the resection of dry hip disease of 5 months standing, in 4 years old children! — hoping even to operate upon them as soon as the diagnosis of hip disease is established.

That is what has been said and done! But what is worse still, in my opinion, is that surgeons of the Paris school (two of them, at least) follow the Lyons surgeons, and have written :

“The road followed by surgery as regards tuberculosis is going to be changed. The method of Berck (injection) is going to give way to the method of Lyons (bistoury)”.

This time it is no longer possible to ignore such statements; and as the Berck method has been especially attacked, I am obliged to compare again the two methods — the conservative and the operative — the treatment by injection and the treatment by the knife.

By doing so I am certain to be of real service to those practitioners who may have been beguiled by the fine language of the “interventionists at all costs”; I am certain to save those practitioners from many disasters and many personal disappointments.

I will consider both methods without bias, endeavouring to give each its due. I wish only to remind you that I have practised both extensively for the 21 years I have been at Berck; I am conservative to day, but I was a great interventionist 20 years ago. Before being the “injecting fellow”, I was called, when I started my practice, the “doctor coupe-toujours”, as far as external tuberculosis was concerned.

But it is not only by the results I myself have obtained with the one or the other method that I will judge them, but also by the results obtained by other surgeons of Paris, Berck and other places, who are especially interested in external tuberculoses.

To be clear and precise, I must divide tuberculosis into three groups : suppurated, fistulous and dry (or fungous) tuberculoses.

1. Suppurated Tuberculoses

(Including those very serious tuberculoses : coxitis and Pott's disease with gravitation abscess.)

What are the two methods worth here?

To judge them fairly, to establish their respective value, we must appeal to those who make the best punctures as well as to those who operate best upon the tuberculoses, that is, those who possess the best technique for the one or the other method, and whose asepsis is equally good.

But, some will say, if everyone cannot perform a perfect operation, at least everyone knows how to make a puncture. — What a great mistake... unfortunately too common! There are hospitals — even large hospitals — where operations are cleverly performed, but where punctures are very badly done! More than that: the head of the service thinks so little of the puncture of a gravitation abscess that he leaves it to be performed by his assistants: the house-surgeon, in his turn, leaves it to the non-resident student, and this last leaves it to anyone who cares to do it.

Would they leave the aspiration of a pleurisy to him? And yet that would be less serious, for this pleurisy, infected by a lack of asepsis, or by a fault in the technique, would be far less difficult to retrieve than an infected Pott's disease — which nearly always means death to the patient.

In other words, one takes great pains in operating upon a tuberculosis, but one takes none in puncturing it.

But happily there are surgeons who are as careful in performing a puncture as in performing a laparotomy: such are surgeons for children: such are all or nearly all the surgeons at Berck.

And do you know the results obtained by those surgeons in suppurated tuberculoses, including hip and Pott's disease? An aggregate of cures ranging from 98 to 99 per cent.

And now compare this with the results obtained by the most expert operators.

Taking the best statistics of operations, we arrive at one-third cures, one-third re-formation of the purulent collection, one-third persistent fistulae. This means, in favour of operation, 33 per cent. of definite cures as against 98 or 99 per cent. for punctures.

So much for the number of cures. But what shall we say of their quality, always better after puncture, obtained without danger, without any of the risks involved in a surgical operation, sometimes very extensive, for instance when one has to deal with a case of Pott's disease?

2. Fistulous Tuberculoses

It would seem that the number of fistulous tuberculoses that interventionists would claim for their knives ought to be very great.

But no : the surgeons of the Lyons school already mentioned leave fistulæ to the conservative methods, acknowledging that in those cases operation is too often unreliable.

Well! this time I agree with them! or rather, they agree with me, as for a long time I have maintained — after having practised both methods — that fistulous tuberculoses ought to be treated, not by operation, but by injections of medicated pastes. And I might mention that those injections we have made at Berck ever since 1897, that is to say, 10 years before Beck of Chicago made them (v. p. 176 and 217).

3. Dry or Fungous Tuberculoses

a) *First, in the adult :*

The principle is that tuberculoses can be operated upon if one is sure to cure them by operation, and sure to cure them without blemish, or at least with no worse blemish than that left by the conservative treatment.

I will explain myself :

It is not justifiable to operate on Pott's disease because, here, the operation would not be complete and would not be immaterial — for, if it does not cure, it will be harmful by leaving a fistula; hence a new state of the patient, a hundred times more dangerous than if nothing had been done. On the contrary, **operation may be justifiable** in cases of **very accessible** tuberculoses, when it can be done in a thorough manner; it may be adopted, provided the second condition is fulfilled, namely that it does not leave a blemish greater than the conservative treatment may leave.

For instance, one may operate upon a tuberculosis of the ribs or of the shoulder-blade, one may resect a tuberculous knee in the adult, or remove a glandular mass in a remote region of the body.

I do not say that an operation is to be preferred in all these cases; far from it. — But one may be done, whilst it must not be thought of for adenites of the neck, where it leaves a blemish — the cicatrix; nor for hip disease, where resection leaves an infirmity — whilst, on the other hand, the conservative method with injections can cure without blemish adenites of the neck, spina ventosa and coxitis.

I am also opposed to operations in cases of tuberculosis of the epididymis and of the testicle, for, out of the 260 cases of those tuberculoses, at all stages, which I have seen during the last twenty years and treated conservatively, *all* have been cured *without exception*, with the preservation of both testicles; true, the cures took from 3 to 9 months, and even, in one case, two and a half years.

But tell me which is the best: to spend two and a half years in order to preserve them, or 2 1/2 minutes in order to lose them for ever?

b) *Lastly, dry tuberculosis in children.* — Here I condemn surgical operations, especially in tuberculosis of the skeleton, and more still in hip disease — as, I believe, all surgeons practising amongst children condemn them.

And the observations published by the Lyons surgeons, on resections performed by them of dry hip disease in children of 4 years of age, 5 months after the beginning of the disease, have not altered my mind on that point.

I will not argue with those very distinguished colleagues upon their immediate results, or upon the fact that, in several of those children, the air pump, the lead stopping of the bones and all the rest of it, have only succeeded in the end... in transforming a closed coxitis into a fistulous coxitis!

I will not argue on that. I am pleased, on the contrary, to admire the perfection of their technique and of their asepsis. But what of the orthopædic deformity left by the resection or erosion of the head of the femur, — that is, by suppression of the growing cartilage!

Even if there is not left at once a very marked lameness, what will there be in a few years, in 4, 6, 8, 10 years? We know only too well.

Whom did those, who have performed those early resections in quite small children, wish to convince that their orthopædic results would equal, ON AN AVERAGE, the results of the conservative treatment in coxitis?

The operation may have been splendid, but it has been unfortunate — it has made cripples... "Your work is beautiful", I tell them: yes, but may it not at the same time be mischievous?

I cannot dwell here on the detailed facts¹, but I believe I have said enough to enlighten you as to the new mania for resection.

I might have waited for the natural death of this method, as the

1. I refer you to the whole of the first part of this book, p. 114 to 566.

German mania for resection died 25 years ago, of which this is only a new edition, revised and corrected (for the so-called new method is not new at all!)

I might have waited for its death in a few years, but before disappearing it could have caused so much harm that I feel it my duty to denounce it here and to warn practitioners against such dogmas!

B. — The safe and practical Method of preparing the Liquids and Pastes for Injection into Tuberculous Foci¹.

(See p. 127 of this book).

Against suppurated external tuberculoses, wherever their seat may be, there is only one treatment for those who have given a fair trial to the different methods; the treatment by punctures and injections.

The question is settled. I do not think there is a single surgeon treating children who would operate on a cold abscess rather than puncture it. Surgeons treating adults are also coming round to punctures; they will all come to them in the end, whether they like them or not. And if there are some blind or obstinate enough not to be convinced, it will be bad not only for their patients but for themselves, for the surgeon who operates upon extensive suppurated tuberculoses remains in an inferior position and is courting all kinds of personal mishaps.

There is no longer any discussion possible on this subject, because the method by punctures and injections is so much superior to the other, both as to the number and the quality of the results.

But this method, which is *the best*, has also the great advantage of being *the simplest* — it is a method which can be applied everywhere, that is, to all patients and by all practitioners; it demands no special surgical education, nor special installation, nor complicated or expensive instrumentation.

What fault can be found with this method of puncture? Truly I do not see any, except one, perhaps, which is merely the excess of one quality; its too great simplicity, or, rather, its too great APPARENT simplicity, which might induce a certain carelessness in those who apply it.

Let practitioners be forewarned; they must realise that, although

1. This article (p. 998 to 1005) is written by my assistant, Dr. Fouchet, of Berck.

simple, the method requires a deal of attention, and will fulfil its promises only on condition that it is applied very carefully and with an absolute asepsis. If asepsis is not perfect, more harm will have been done than good, and it would have been a hundred times preferable to have abstained from it.

"Asepsis in performing a puncture must be as thorough as in performing a laparotomy", Dr. Calot has said, for a long time.

Unfortunately, this precept is too often forgotten or ignored. Many faults against asepsis occur in punctures, and especially in injections, on account of the great difficulty there is in obtaining well sterilised modifying liquids.

For this reason I would like to give on this subject a few practical hints not to be found in books, and which will enable practitioners to avoid this faulty asepsis.

Let us proceed in order :

1st. *Asepsis of the hands.* On this subject, I have nothing to teach you. If, in spite of careful washing, you still have doubts as to the absolute cleanliness of your hands, wrap them simply with a compress which has been boiled: your fingers will still be free enough to push in the needle and to handle the aspirator or the syringe; a puncture or an injection does not require such precise movements as does the suture of a stomach.

You could also use gloves; you can make them on the spot (using by preference a waterproof tissue — v. fig. 108 and 109).

2nd. *Asepsis of the operation field.* — Here again there is nothing unknown to you; paint the skin freely with iodine tincture; do not be afraid of using too much of it, as you can always remove any excess of iodine (after the small and short intervention) by washing with alcohol.

3rd. *The sterilization of the instruments* is very simple if you make use of the Calot set (fig. 1072), of which all the different parts can be boiled: an aspirator with asbestos piston, a glass syringe of 10 c. cm. capacity, one or two nickel-plated steel needles¹.

Put them in a fish-kettle $\frac{3}{4}$ full of cold water gradually heated up to boiling point; by so doing your aspirator or your syringe will never break, as they would surely do if you were to dip them suddenly into boiling water.

See that your instruments are completely immersed in the water

1. Never pass steel needles through the naked flame: they would deteriorate. Platinum needles can stand the naked flame; but their excessively high price prevents their being commonly used.

up to the time of using them; you will thus avoid their becoming tarnished or « spotted ».

As soon as you have done with them, wash them with warm water and with alcohol, and dry them well. If they are washed and dried each time after use, a short boiling of 5 or 10 minutes will be sufficient before using them at the next sitting.

4th. Now I come to the fourth point, to the most important as well as the most embarrassing question for most practitioners, na-

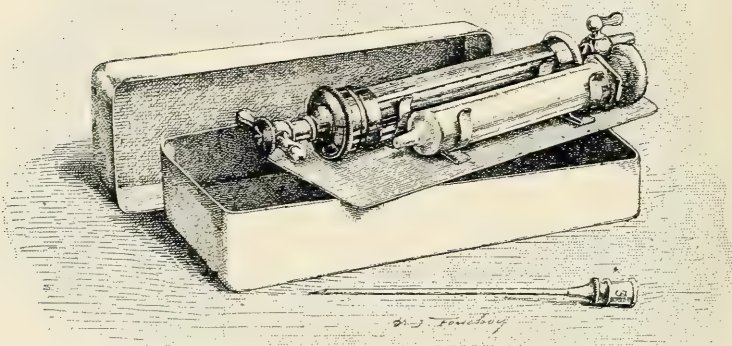


Fig. 1072. — Calot box, containing an aspirator, a syringe and a needle.

mely : *the asepsis of the different modifying substances* to be injected into the tuberculous foci.

a) The most important chapter. — If non-aseptic hands, instruments, or dressing material insufficiently sterilized, can be so many causes of infection, what shall we say as to the injected liquids which remain in the cavity, and whose septic germs, if they contain any, can freely grow and multiply in this closed vessel, in the best possible medium? It is like the wolf shut up in the sheepfold!

b) The most embarrassing chapter for practitioners, and, on this account, often disregarded by them.

This is what happens in practice. You ask your pharmacist to prepare the liquids. But does he know, your ordinary pharmacist, that the slightest fault on his part may bring about the infection of the abscess and perhaps the death of your patient?

Can you be certain that he will assure asepsis more for this

preparation than he would for the preparation of a julep, or even of an enema? Are you quite sure that, if he is very busy, he will not leave the preparation to his "errand boy", who will be still less careful?

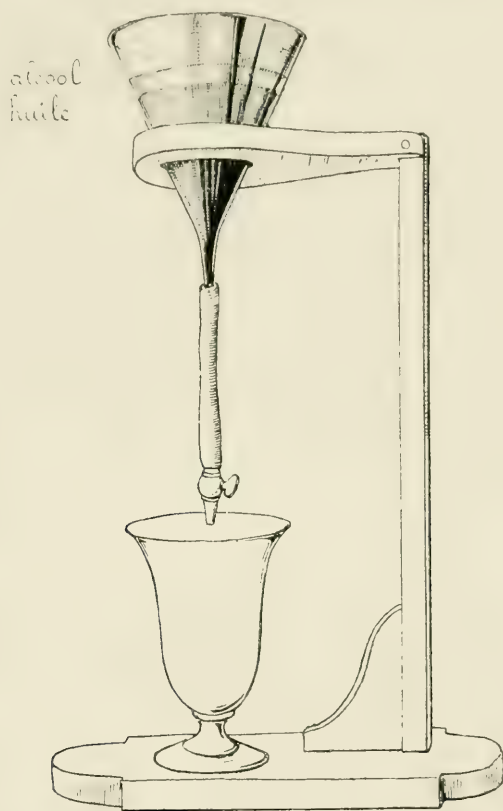


Fig. 1073. — To remove acidity from the oil, add to it some alcohol in the proportion of 1 per 100; shake and allow it to settle. The oil, heavier than the alcohol, runs out first when the tap is opened.

Am I exaggerating much? There are, of course, I know, many very honourable exceptions, but is not my criticism too often founded on fact?

But could not these preparations be obtained from some of the more important laboratories? No; it would not be practicable. Be-

sides the fact that the cost would be too high, you may have to inject, in suppurated tuberculosés, liquids varying greatly as to quantity and quality, according to the different cases, even varying them at times in the same case.

And, on the other hand, there are certain substances, such for example as camphorated naphthol and glycerine, which must not be prepared much beforehand.

What then? Well, there is only one way, only one wise, certain, and practical way. That is to trust only to yourself for the preparation, and as it is a vital question for your patient, do not hesitate.

You sterilize your instruments yourself; it is more important still not to leave to others the preparation of the substances to be injected and left in the tuberculous cavities.

The preparation is not very difficult as you will see; no particular « tour de main », no special knowledge is required.

I have charge, in the service of D^r Calot, of the preparation of these medicated substances, and, after the few unavoidable difficulties at the beginning, I succeeded easily; and it is to spare you these slight difficulties that I want to tell you the right method; all the more so that you will not find in your classical treatises, I repeat it, the necessary practical indications on the subject.

LIQUIDS ¹

1st. *Camphorated Naphthol*. — Camphorated Naphthol is an antiseptic in itself; the only precaution to take is to keep it protected from the light to prevent its decomposition, shown by its change of colour (it becomes black, whilst when fresh it is clear).

When naphthol is used mixed with glycerine (camph. naphthol 1 gramme; glycerine 5 grms.) the glycerine must be sterilized by boiling.

It is as well, perhaps, to repeat here that this mixture being very unstable, must be prepared and shaken vigorously for one and a half minutes *immediately* before it is injected.

1. Although I do not intend to give you the indications for each liquid, I would remind you that there are a number of them, perhaps not of equal value, with which you can obtain good results, and which can be divided into two groups; the softening and the sclerosing liquids; among the first, the most often used is the glycerinated camphor naphthol; among the last, iodoform creosote and oil.

2^d. I will mention, in the second place, a liquid of very easy preparation, obtained simply by mixing equal parts of camphorated naphtol, camphorated phenol, sulfuricinated phenol and spirit of turpentine. (This is the « *4-liquids softener* » of Dr. Calot.) Acting vigorously in an injection of 4 or 5 drops, this liquid can render you great assistance in starting the softening of a very hard tuberculoma which has remained unaffected by glycero-camphorated naphtol.

3^d. *Iodoformed-creosoted oil*. — It's formula is :

Olive Oil.	70 grammes.
Ether	30 —
Creosote	5 —
Gaiacol.	1 —
Iodoform	10 —

To prepare this mixture, procure very pure olive oil, the acidity of which you remove with alcohol (fig. 1073); sterilize it by boiling in any kind of receptacle (if it is pure it will not blacken on boiling).

In a mortar, previously passed through the flame, you mix and triturate the iodoform, the creosote, and the crystallised gaiacol in the proportions indicated.

Upon this you pour slowly the oil, stirring with an aseptic glass rod: but the oil must have previously been allowed to cool down to below 60°, for the iodoform of the mixture would be decomposed at that temperature. And in the same way you will add the ether only when the oil is perfectly cold, to avoid its evaporation.

When your mixture is finished and well stirred, place it in a glass-stoppered flask, well sterilized by boiling in water, and keep it protected from the light.

Shake the flask before each injection.

PASTES

For fistulous tuberculoses, Dr. Calot advises the injection of practically the same active principles, and they are those indeed which procure the most certain and most rapid cures: the substances used as vehicles alone are changed; the olive oil, for instance, is replaced by lanoline or spermaceti.

But the use of one vehicle in preference to another is not a matter of indifference: you must choose products of animal or vegetable

origin as being the only ones capable of being absorbed by the tissues; products of mineral origin, on the contrary, are not capable of being absorbed, they remain indefinitely where they are injected, hindering the drainage and causing sometimes real retention of pus and all sorts of accidents which may even bring about death. You understand from this why the preparations containing paraffin must be rejected.

On this ground lanoline and spermaceti will entirely satisfy you. Here is the formula of the mixture :

Lanoline.	50 grammes.
Spermaceti.	50 —
Camphorated naphitol	6 —
Camphorated phenol	6 —
Iodoform	20 —
Creosote.	8 —
Crystallised Gaiacol.	7 —

This preparation is liquid at 41°5 and solid at 37°5.

You must ask your chemist for absolutely pure lanoline, and refuse all lanoline not perfectly white, or showing a yellowish tint; otherwise the melting point of your mixture would be too low and it would not solidify at the temperature of the body.

METHOD OF PREPARATION. — Lanoline and spermaceti are mixed and heated to boiling point in any kind of receptacle (by preference one of porcelain or earthenware). Some precautions are to be taken when boiling this mixture, for it will « boil over » just as milk does when it is being boiled. So that you would be scalded if you were not careful to *stir continuously* with a glass or a metal rod.

When these two substances, lanoline and spermaceti, are thus sterilized, let them cool down to about 50°; but do not wait until they are solidified to incorporate the other products given in the formula, and which must have been previously carefully mixed and triturated in a sterilized mortar.

Keep the preparation sheltered from the light.

The mixture, solid at the ordinary temperature, is of a fine yellow colour, and must preserve that colour.

When you wish to use the paste, warm it in the water-bath up to about 41°, where it liquifies (this takes 8 or 10 minutes).

Be careful not to let it reach 55° or 60° and, of course, not to let it boil; the iodoform would be decomposed and the paste would assume a brownish tint.

Inject the paste by means of a glass syringe of 10 or 20 c. cm. capacity, fitted with metallic nozzles of different shapes according to the direction and the depth of the fistulous track (see fig. 147 to 152).

Keep a tampon on the fistulous orifice — or orifices — up to the solidification of the paste, which requires one or two minutes (see fig. 159).

Whether the tuberculosis is open or whether it is closed, apply a copious dressing, covering it well: do not be content with the classical collodion applied over the cutaneous orifice.

If you do all this — and you see that it is not particularly difficult — you will ensure the perfect asepsis of the punctures and injections and you will cure your patients without any difficulty, always or nearly always, perhaps 99 times out of 100. Is there any other method (operation or abstention) of which the same can be said, which would yield results to be compared with these?

It is worth our while to observe all possible precautions if thereby we are to attain such beautiful results!

C. On Fistulous Tuberculoses

(Refer to p. 171 and 217.)

a) Preventive Treatment

(The real treatment of fistulæ is to prevent their formation. It is he who knows WELL how to puncture, who can avoid them.)

Certain truths must be repeated again and again:

— In tuberculosis, the danger is the fistula.

— Death is still often ¹ the ending of external tuberculoses (especially of suppurated hip or Pott's disease).

1. But still I am far from agreeing with what a hospital surgeon wrote quite recently, that « Pott's disease ends in death in half of the cases »!!! — If this is not a *lapsus*, it is a gross exaggeration, and I cannot believe that, even in a very old and unhealthy hospital in a large town, the mortality can be so great, unless the methods followed there are particularly defective; if, for instance, they still open and operate on all abscesses in Pott's disease. If this is the case, I understand too well, alas! that they will have such a high rate of mortality.

— And 9 times out of 10, death is due to a fistula (or to its consequences, hectic fever, albuminuria, visceral degeneration).

— So that surgeons could avoid 90 per cent of the deaths by external tuberculoses if they could suppress fistulæ.

— Is it possible to suppress fistulæ?

— Yes : not so much by seeking for a new way of curing them as by using the means (which we already possess) of preventing their formation.

Causes of Production of Fistulæ

1st. **The greatest producers** of fistulæ are the **surgeons who operate** on external tuberculoses and open the abscesses.

So that those who operate are those who will most often see fistulæ and also the greatest number of deaths (in external tuberculoses).

2nd. As producers of fistulæ come next (but far behind the first), the *practitioners* who never interfere with *abscesses* and so *allow them* to open (this spontaneous opening of the abscesses occurs once in two cases on an average).

3rd. And lastly, those who *puncture badly* are also producers of fistulæ.

I have spoken at some length of the first two cases, but not sufficiently of the third one.

No, I cannot repeat too often that punctures are generally very badly done. And the worst of it is that everyone thinks he knows how to make than.

If it is easy to suppress the first two causes of production of fistulæ since it is sufficient for that to replace operation or abstention by puncture, how are we to do away with the third cause? How are we to teach the method of puncture to practitioners who, thinking they know more than anyone else, will not listen to our teaching?

And, if they would only look at what is going on around them, their eyes would soon be opened to their ignorance and their inability to perform a puncture. Indeed, one could find two hospital services in the same large town, perhaps even in the same hospital, where punctures are performed (in both services), but whilst in one of the them, punctures suppress fistulæ at least three times out of four, in the other, it is the inverse proportion that is the rule : 3 times out of 4 fistula succeeds to puncture (notwithstanding the puncture, and oftentimes, because of the puncture)!

At Berck, fistula is avoided not only 3 times out of 4, but 99 times

out of a hundred. One could object that this superiority in results is due to the superiority of the climate and of the general treatment; it may be so, and this is why we have compared two hospital services in the same large city, that is, both situated in the same surroundings.

Now is not this difference of results of the two services striking enough! Does it not show clearly enough the difference between good and bad punctures?

Will there still be found after this, open-minded practitioners who, unable to avoid fistulae, refuse to admit that they ignore the method of puncture and that they have the greatest need for learning it?

How to learn to perform Punctures?

Evidently the best way is to see it done — to make a stay, if ever so short, at Berck or in some private hospital where punctures are well performed (which will be easily recognised by the fact that there, in 9 cases out of 10, fistula is avoided).

And it is for those practitioners who cannot go there or, rather, *who will not go there*¹ — for all could go if they chose — it is for those that we have described at length, in 50 pages, all the details of this technique of punctures, with all the incidents that may happen and the way to overcome them (see Chap. III, p. 115 to 163).

We will not go over the same ground again; we will merely remind you, in a rapid enumeration, of the principal faults which can be committed : *faults of which fistula is the result and the punishment.*

a) Lack of asepsis, too likely to happen in those frequently repeated interventions which seem somewhat banal and of small importance.

b) Large trocars are used, instead of our n° 3 or 4 needles.

c) The abscess is kneaded too roughly, in order to empty it, instead of aspirating the pus gently with our small aspirator.

d) The needle is pushed straight in upon the prominent point of the abscess, where the pus is near the skin, and where the skin is very thin, whilst one ought to prick far away in a sound part, and reach the abscess by a sub-cutaneous, or even sub-aponeurotic path, very obliquely.

1. And why will they not go? How can they better spend their time? To learn how to treat all the external tuberculoses (those exceedingly frequent diseases!), what a new string to their bow! What a splendid way to raise their status, moral and even material! I could so easily support these remarks by facts and examples.

e) Puncture is made too late, when the skin is already red and threatened, that is, already infected by tuberculosis; in this case the skin can no longer be *SAVED* (it will give way and a fistula will result).

f) The punctures are made too frequently, or too rarely.

g) The number of punctures is too great, or insufficient.

h) The injected liquids are too active, or not active enough; the dose is too great or too small.

i) The constant blocking of the needle, the slow emptying of the abscess cause impatience; one pricks the skin all over with the needle, or one decides to "have done with it" and open the abscess!

You must know that sometimes (for an abscess of Pott's disease, for instance) you may be obliged to make up to 70 punctures in order to empty it (as has happened to me), but, by so doing, it is cured. Had we stopped before, it would have meant a fistula, and one or two years later, very likely the death of the patient.

So then, one errs by ignorance or by lack of faith. One ignores all that can be got from the method by punctures (a method, let us repeat, which, well applied, cures always or nearly always, 99 times in a hundred).

And these remarks apply as well to foreign as to French practitioners. During my travels abroad, I have been convinced that those punctures are even more badly done than in France.

There, also, they lack faith, because they have not seen it well done. Ah! let me say it again, if only all the practitioners in France and abroad, who have to treat suppurated tuberculoses, could come and see what the Berck surgeons obtain from this method of punctures!...

On the whole, the way to avoid fistulæ is to puncture, provided one knows how to puncture well.

So much for the preventive treatment of fistulæ.

Now we come to their curative treatment — for, alas! we shall always see patients coming to us with fistulæ already existing without taking into account the fact that, once or twice in a hundred, I admit, whatever is done, even if punctures are faultlessly performed, it is not always possible to avoid the production of a fistula.

Curative Treatment of Fistulæ

The treatment can be summed up thus :

Local treatment ; asepsis and injections of our medicated pastes, rest, and immobilisation of the affected part.

General treatment : life in the country or on the mountain, or,

better still, at the sea-side. Continual exposure to the open air, to the light, and to the sun.

One succeeds thus — with patience and in time — in curing the whole (or nearly) of the fistulæ which come to us not infected, that is, without fever or albuminuria.

For infected fistulæ (fever and albuminuria), the same treatment, adding to it a milk diet, and dispensing with the paste injections. — These injections of pastes will be made only after the disappearance of fever and albuminuria, if ever they disappear: this one cannot definitely promise when it is a question of infected fistulæ of Pott's or of hip-disease (which still too often mean death to the patient, sooner or later, from visceral degeneration and general wasting of the organism); but one can promise the cure of fistulæ of other regions, even when they are infected, for, if drainage and asepsis do not cause the fever to subside, there is always the supreme resource of amputation; but it is seldom that one has to resort to that. It is now more than 5 years since, in our own practice, we have had to perform a single amputation for tuberculoses.

We will not now return to the technique of the curative treatment of fistulæ, described at length in the first part of this book (v. p. 170). We will simply give a few observations upon patients, so as to better show you the way to act in the presence of each variety of fistulæ.

Obs. I. — Multiple fistulæ of the testicle and epididymis on both sides. Double fungus. Cure by the conservative treatment.

The following observation is on the patient shown in fig. 181, p. 222; Pierre G., 26 years of age, who came to Berck three years ago, very thin, pale, cachectic, with three large tuberculous localisations; dorsal Pott's disease, costal suppurated tuberculosis, and wide and multiple ulceration of the scrotum, ulcerations giving passage to a profuse, bloody, and evil-smelling discharge.

We will notice here the third focus only. The scrotum was of the size of a child's head, and had now been transformed into a fungous and suppurating sponge, producing an abundant discharge of pus on the slightest pressure on any one point. In this enormous mass, it was impossible to distinguish the testicle and the epididymis from the tuberculous neoformations.

On the right and left sides, oozing fungosities produced a hernia of 3 or 4 cm. through the cutaneous ulcerations.

Here there was no hope of conservation, according to the unanimous opinion of all the surgeons who had seen the patient.

He was told that "the only rational treatment of this ulcerated tumour, affecting both testicles, the epididymes, and the skin, was amputation at the root of the scrotum". This treatment was all the more necessary because

the profuse and evil-smelling suppuration exhausted the patient, suffering besides, as you remember, with two other severe tuberculoses — Pott's disease and a suppurated costal tuberculosis.

And still, notwithstanding everyone or everything, hoping against all hope, we decided to attempt conservation.

From all we have said in this book, you may surmise the treatment; rest in the recumbent position (necessitated by the Pott's disease), life on the sea shore from morning till night.



Fig. 1074. — Cure of multiple tuberculous fistulæ affecting both testicles and the epididymes (see Observation I).

Local Treatment. — We did our best to disinfect the ulcerations and the fistulous tracks by washing with permanganate of potash, then we injected creosoted oil and iodoform and our medicated pastes.

For five months, no, or hardly any, amelioration; but from that time the general condition as well as the local conditions changed manifestly, so much so that, after one year, cure, although far from being complete, was nevertheless certain. Complete cicatrisation was obtained in 2 1/2 years.

See in fig. 1074 the appearance of the region. The size of the scrotum is nearly normal; on the left, the testicle and the epididymis are of a dimension and a consistency nearly normal; on the right side, one can feel two indurated nuclei against the epididymis, but painless and, it seems, formed by cicatrix and sclerosed tissue.

Functional result; the patient has already some priapism at night; as yet he does not present a more decisive proof, but he may hope for the best.

At the same time the general condition has become perfect. The Pott's disease is cured, the pointed gibbosity is effaced (thanks to plaster corsets with compression), the suppurating costal osteitis is also cured (by punctures and injections).

I will repeat here that, for the last 18 years, we have not seen a single tuberculosis, even suppurating, of the male genital organs, which has not been cured by our treatment, lasting, in most cases, less than one year; this case has, therefore, been by far the longest in being cured.

(Obs. II. — Eleven Fistulæ (osteitis of the leg and the foot) existing for 21 years and cured at Berck in 10 months.

Etienne K., of Paris, 33 years old, had from the age of 11 years, on the instep, a large tuberculous focus, which had spread progressively on to the leg and the foot.

The bones were affected from the middle of the leg down to the toes. Over this large surface, 11 fistulæ were open when I saw him for the first time.

The pus issuing from all those fistulæ had recently become more abundant; enforced rest in a house at Paris, loss of appetite, and the copiousness of the discharge, had weakened the patient to such an alarming degree that all the surgeons who were consulted had unanimously agreed that the only way to save the patient's life was to amputate the leg, which, apparently, would never heal; a doctor (a radiographer) had even said to the patient: "It is no longer osseous matter that is in your leg and foot, it is merely gelatine, and pulp."

The danger was immediate and pressing. A fortnight more waiting, he said, and it would be too late; a date for the operation was settled on with the family; it was to be on the Tuesday.

On the Monday, the day before, I was called in consultation to Paris and my opinion, against that of all my colleagues, was not to decide upon the sacrifice of the leg before having made a serious, long, and patient attempt at conservation. And I summed up my advice thus: "If, after a reasonable delay, which we will fix ourselves, say after 10 or 12 months of this serious attempt at preserving the leg, we have not arrived at a satisfactory result, then, but then only, I will agree to amputation." I contended, moreover, that by waiting we would lose nothing; that the local and general conditions could only be improved by our treatment, and that, if amputation had to be performed after all these persevering attempts, the leg would be disinfected at least partially; the patient would have then a greater amount of physical resistance than he had now, and, moreover, he would be convinced that the sacrifice of his leg was absolutely necessary and that there was no possible way to avoid it. My colleagues kept to their ground and replied that this attempt at conservation would delay or even compromise a cure, that amputation only could effect it! Well, we could not agree. But when I was gone, the

patient declared firmly his intention of following my advice, clinging desperately to this sheet-anchor which allowed him he hope, if not to avoid, at least to put off, the dreaded amputation.

On the day after, he was brought to Berck against the opinion, I repeat it, of all my colleagues, and even of his own people.

Treatment at Berck : perfect rest, in a small carriage; outdoor life, on the shore. Daily dressings — and every four days, an injection of creosote — camphorated naphtol and iodoform.

Five months later, great amelioration in the general condition, but, I had to acknowledge, no appreciable local result. We were in the sixth month of this treatment when I thought I could see a slight amelioration in the fistulous openings. And indeed, at the end of the month, two fistulæ (out of the eleven) were closed.

During the seventh month, another one was healed; in the following month four, then three. At the beginning of the tenth month, only one remained. From that time I felt certain of the cure of the patient. The cure was effected ten months and a half after the beginning of the treatment.

The cure, complete and definite, is still maintained, after ten years. For ten years the patient has carried on his tiring work; he goes about with his foot, which, massaged regularly, has regained, not only strength, but even suppleness; he makes good use of the foot and the leg of which the radiographer said, " They are not bones that you have there, but a mass of gelatine "!

Obs. III. — Ulcerated tumour which had destroyed the skin of the anterior part of the leg; the ulcerations, which had existed for two years, and which we recognised as being tuberculous, have been cured in 8 months.

This is the patient shown in fig. 186, p. 227. He is a man, 35 years old, Pierre B., of Lyons, sent to us by his brother, a doctor, for an ulcerated tumour of the anterior aspect of the leg, a tumour which had resisted all treatments for nearly two years.

There had been much hesitation and discussion as to the nature of this ulcerated tumour, which presented all the appearances of an epithelioma. There were five ulcers each the size of a 5 francs piece, separated by small, cutaneous bridges, of hardly a few millimetres in breadth, of low vitality. Soon, indeed, these bridges were destroyed in their turn and there resulted a vast ulceration, larger than the palm of the hand, with thin and irregular edges; the ulceration resting upon a downy and greyish coloured ground. A cancerous tumour, I repeat it, was thought of, then syphilis, then a mycosis, and lastly an osteosarcoma; this confusion was supported rather than dissipated, by radiography (v. fig. 1075). At last the diagnosis was settled by the bacteriological examination of the ichorous liquid produced by the ulceration; Koch's bacilli were found in it.

Treatment. — We had to resort to all kinds of local treatments, chan-

ged every day, namely : our powder (see p. 161), that of Championnière, zinc peroxide, neol, camphorated naphthol, iodine solutions, etc., and radiotherapy.

But, for three months, nothing was of any avail; it was only after this long time that we were able to notice a slight sign of cicatrisation. Then from that time it progressed, but how slowly! and even at times we had relapses. Eight long months were necessary to obtain complete cicatrisation, but this time it was definite.

Obs. IV. — 23 infected fistulæ (hip disease) existing for the last fifteen years. — In a year we had already closed 20 of these fistulæ; only three insignificant ones remained. Infection has disappeared, the weight of the patient has nearly doubled.

Here is a coxalgic, twenty years of age, Cariberto B., from Buenos Ayres, who arrived here with 23 fistulæ, disseminated all around the affected hip, on the pelvis, and right up to the root of the sound limb (this patient is shown in fig. 188, p. 229). The fistulæ had existed for 15-12 years. The first had succeeded (soon after the onset of the disease) resection of the hip (made for a closed hip disease!). A new operation was performed with the hope of curing the fistulæ; only result, 3 new fistulous openings; operations were again performed at repeated times in America, in France, and in Germany. The more the pa-

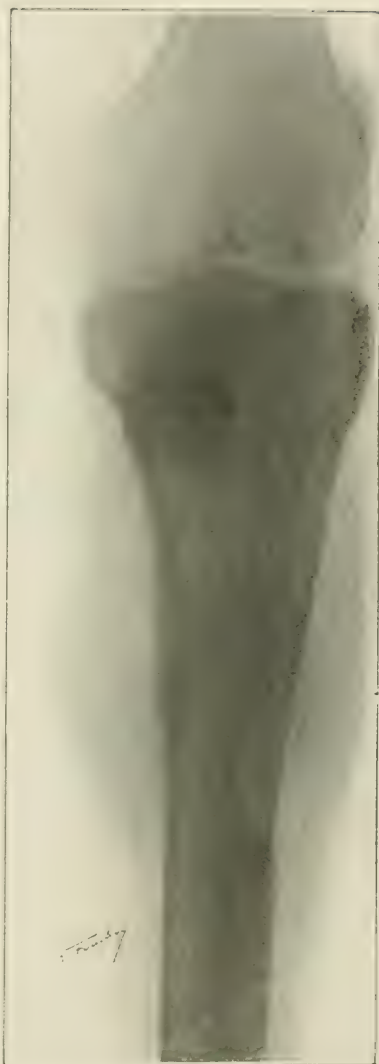


Fig. 1075. — Radiogram of the right tibia: the bone is jagged, full of lacunæ; the edges are "unravell'd", a globular mass filling the soft tissues; one might think we had an osteosarcoma.

tient was operated upon, the more fistulæ were produced, and the more he wasted away. And in spite of all these, a new operation was spoken of at Paris, when he had the idea of going to Berlin to consult Professor Bier, who, considering the very bad local and general condition of the patient and



Fig. 1076. — A young man who came to Berck with 23 infected fistulæ (hip disease); see fig. 188, p. 229, the fistulæ existing for 16 years. Cure (nearly complete) after 18 months of our treatment. The weight of the patient has nearly doubled; 50 kilos instead of 30.

the failure of all operative treatment, sent him to us to be treated by our conservative methods.

He came to Berck a little over a year ago — nearly dying. — He weighed 30 kilos. (at the age of 20 years!). His complexion was yellowish and dull, he was dyspnoëic, strengthless, sad, nearly inert, with a broken voice. His wounds and all his body exhaled a most objectionable odour, which could be perceived at a distance, and was extremely objectionable to himself and to all those who lived in the same house, his 23 fistulæ giving vent to a quantity of very fetid pus.

Urine scanty, with traces of albumen, appreciable hypertrophy of the liver, which extended slightly below the false ribs. Evening temperature above 37.5°. Alternating constipation and diarrhœa.

Such was the state of the patient when sent by Professor Bier. Although we had confidence in our treatment and in the life at Berck, we did not, we dared not, promise to cure him. "There are only 1 or 2 chances in 20 of saving him", we said.

Treatment. — We ordered complete rest (dorsal decubitus). We endeavoured to disinfect his wounds by daily baths, dressings with iodoform, or permanganate of potash, twice every day, etc. We made him live the whole of the day on the shore, lying on a frame. Soon the fetid smell with which he was impregnated subsided. He could eat a little, rest, and sleep. His icteric complexion brightened up, his urine became a little more abundant (we had ordered milk diet).

At the end of three months there was no trace of albumen; the temperature was normal again; the discharge less copious and no longer fetid.

Little by little we began the injection of our paste, the injection being pushed in through one of the fistulæ whilst 3 or 4 assistants were occupied in stopping the other 22 fistulous opening in order to prevent the injected paste from escaping. We repeated these injections about every ten days.

After five months of this treatment and of 2 dressings a day, 14 fistulæ were closed and the patient was 10 kilos. heavier!

Today, after a little over a year of this treatment, there remain only 3 small insignificant fistulæ, giving issue to hardly a drop of pus, and which are dressed only every week.

It is even no longer pus, but a perfectly odourless serosity. Complete cicatrisation is now certain and even near at hand. The patient weighs 50 kilos (instead of 30, as on his arrival). He looks pink and fresh, and is lively and happy.

This is an example of the "resurrections" which one may sometimes obtain, which must be aimed at, but which it is not safe to promise as certain, when it is a question of patients as cachectic and as infected as this one.

Obs. V. — Hip disease with 15 fistulæ. — The sea (with our injections) succeeds where altitude (with heliotherapy) has failed.

Berthe C., 17 years of age, of Zurich, came to Berck 18 months ago, pale, cachectic, lame, and suffering from a right hip disease. Swollen hip covered with fistulæ; there were fifteen of them suppurating abundantly and necessitating daily dressings. The child had just been treated for 2 years in a sanatorium (on the mountains in Switzerland) by heliotherapy, but without success for, notwithstanding this treatment, very strictly applied, the general condition of the child was becoming constantly worse and instead of one fistula which she had on arriving at the sanatorium, she had 15 infected fistulæ and fever. Her parents, who had lost all hope of saving her, had taken her

home again, when a distinguished doctor from Cairo, Professor Hobbs, saw her, and suggested her coming to Berck.

Treatment at Berck. — Rest, as complete as possible (the parents having refused the absolute rest which we had prescribed). Disinfection of the wounds by irrigation with permanganate of potash and lysoform.

After 3 months we began our injections of pastes at the rate of one about every 12 days (see the technique of these injections on p. 179, fig. 159, where precisely the same child is shown).



Fig. 1077. — 15 fistulæ in a case of hip disease for which the heliotherapeutic treatment in Switzerland had failed. The Berck treatment was successful (see next figure).

This treatment has been kept on for one year; the actual condition of the child is entirely altered.

From being cachectic and yellow, which she was, she is now fresh and pink and full of life; she has gained 10 kilos. The 15 fistulæ are closed except three, from which there is a slight oozing, and they are dressed once or twice a week; and even these small fistulæ have been closed several times here, but have reopened after a short time.

We have today the moral certitude of being able to close permanently and definitely those fistulæ, and that in the near future.

Obs. VI. — Fistulæ with a voluminous sequestrum produced by necrosis of all the inferior part (the lower fourth) of the ulna. It had been said that the hand ought to be cut off. Nevertheless it has been cured without operation. The sequestrum



Fig. 1078. — The same child (v. fig. 1077) nearly cured today, after 18 months of our treatment at Berck.



Fig. 1079. — Tuberculosis of the wrist with sequestrum, Observation VI.

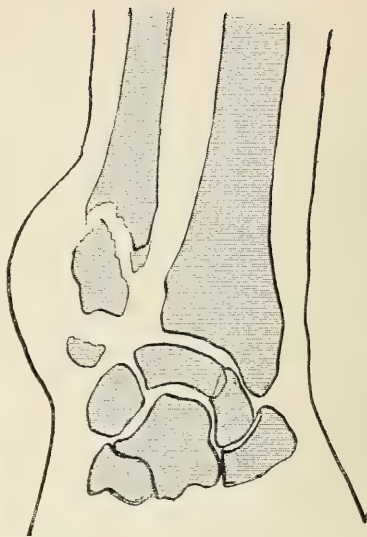


Fig. 1080. — Explanatory sketch of the radio in fig. 1079.

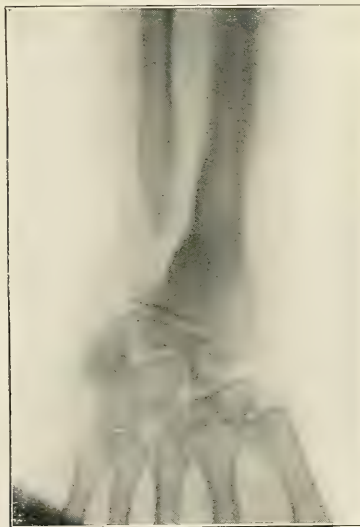


Fig. 1081. — The sequestrum has been removed without operation. Notice in this figure the adaptation of the articular extremity of the radius to its functional rôle; it has slightly developed inwards, so as to supplement the missing inferior extremity of the ulna.

was eliminated spontaneously. But the cure was effected only 2 years after the elimination of the sequestrum. Today, the function of the hand is normal (fig. 1079 to 1083).

White swelling of the wrist—multiple fistulæ which succeeded the spontaneous opening of the abscess, which had not been treated (1881 and 1882).



Fig. 1082. — Actual condition of the hand of fig. 1079 and 1081.



Fig. 1083. — The hand bent. The strength and the function of the hand are practically normal.

Treatment. — In 1882, injections of camphorated naphthol into the fistulæ. In 1883, the large sequestrum shown in fig. 1079 came pointing through one of the fistulæ. We merely extracted it with forceps. In the following year, elimination of another smaller sequestrum. Notwithstanding the elimination of the sequestra, the suppuration still continued for over 2 years. Injections of creosoted oil and of camphorated naphthol. At last, in 1906,

cicatrization was complete. The cure has been maintained for the last 6 years.

Today the strength of the hand and its functional power are practically normal.

This observation shows that there is no need to use the bistoury when a sequestrum is present; cure can be obtained without operation; for, the sequestrum will either be worn away by the injections or spontaneously eliminated.

The cure would not have been hastened by an operation, by the removal of the sequestrum, because, after its coming out, the cure was still delayed for 2 years; this is not surprising, for the soft tissues and the osseous parts near the sequestrum were still permeated with tuberculosis.

The only logical and complete operation would have been, here, amputation, whilst, with our method, not only could the hand be preserved, but it renders today, as it has done for the last 6 years, all the services that could be got out of a normal hand.

Obs. VII. — A proof that surgical operations produce sequestra. — Example of fistulæ and sequestra caused by a surgical intervention (they were cured at Berck by our conservative treatment) (fig. 1084 to 1089).

Observation VI has proved to us that there was no necessity for an operation to remove the sequestra; observation VII shows that operation in itself may produce sequestra, the traumatism produced by it destroying the last means of nutrition of the affected bones, already very poor in vitality. Here is the observation :

Robert P., 6 years old, underwent at Paris a surgical operation for a closed tuberculosis of the wrist : scraping of the inferior extremity of the radius. Arrived at Berck in February 1898. This was two months after the operation.

On his arrival we found : a fistulous opening (dorsal aspect of the wrist), granulations over the area of a 2 francs piece, suppuration necessitating daily dressings.

1st. radiogram, on arrival (fig. 1084 and 1086).

From February to April, 10 injections of iodo-cresoted oil : the fistula diminished little by little and was completely closed at the beginning of April. A week after the closing, a collection on the wrist near the palm : skin red, tense, fever 39°.

Puncture without injection : fever subsided, but the collection re-formed : new puncture 8 days later.

Then the fistula reopened and suppurated up to the middle of June.

From April to June, 8 injections of camphorated naphthol.

2nd. radiogram, on June the 5th (fig. 1085 and 1087).

The sequestrum appeared at the orifice of the fistula on June the 16th, and was easily removed with forceps.

2 injections of oil at a week's interval; cicatrization on June 28th. Since then the wound has remained closed (v. fig. 1088 and 1089).

The function of the hand is again practically normal.

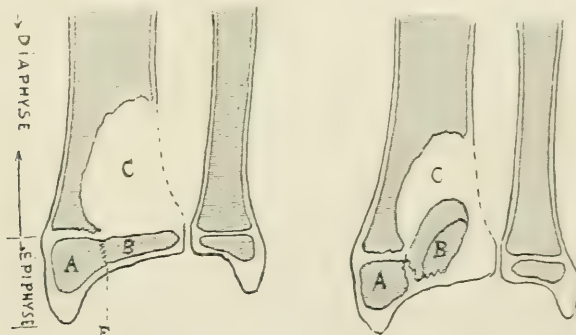
A proof that operations may produce sequestra
(V. obs. VII and fig 1084 to 1089)



Fig. 1084. — Radio N° 1. Tuberculosis of the wrist. Here can be seen plainly how extensively the surgeon has hollowed out the inferior extremity of the radius. The internal two-thirds of the epiphysis of the bone have bent upwards, and tend to enter the cavity made by the operation.



Fig. 1085. — The same patient. Radio n° 2. The sequestrum is becoming isolated. The greatest part of the radial epiphysis, quite necrosed, has been separated from the rest and is now placed in the upper part of the cavity made by the operation.



Explanatory schemata of Radios 1084 and 1085.

Fig. 1086 and 1087. — The operation has produced a vast cavity, C, in the lower end of the radius. The epiphysis, damaged by the operation, has been gradually separated at F. (schema n° 1: its internal segment B has tipped over and has entered the cavity, where it has become a sequestrum (schema n° 2).

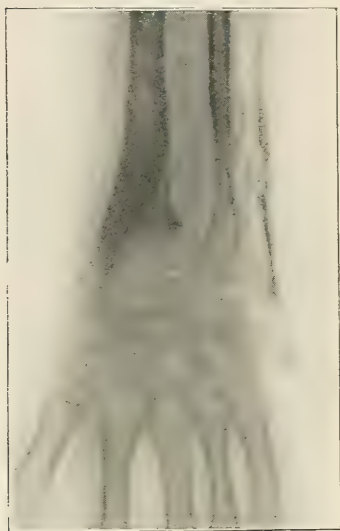


Fig. 1088. — The same. Radio n° 3.
The sequestrum has been discharged.

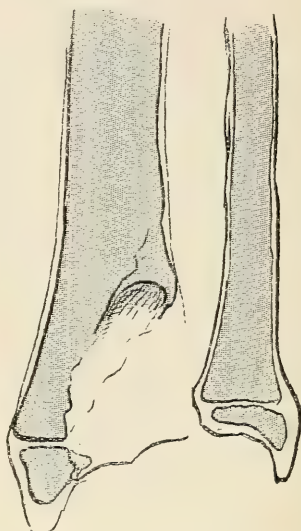


Fig. 1089. — Explanatory sketch of
Radio n° 3 (fig. 1088).

The fragment of epiphysis which necrosed and had formed a well isolated sequestrum, pointed through the fistula; it was easily removed. A few modifying injections were made during the following days. Two weeks after the removal of the sequestrum, the fistulous wound closed, completely and definitely.

2° ON THE TREATMENT OF FRACTURES

A. — Fractures of the Patella

(Refer to p. 85.)

The best treatment, theoretically speaking, of these fractures is, doubtless, to open the focus of the fracture, to lay both fragments bare, and to perform suture, or at least screwing together of the fragments.

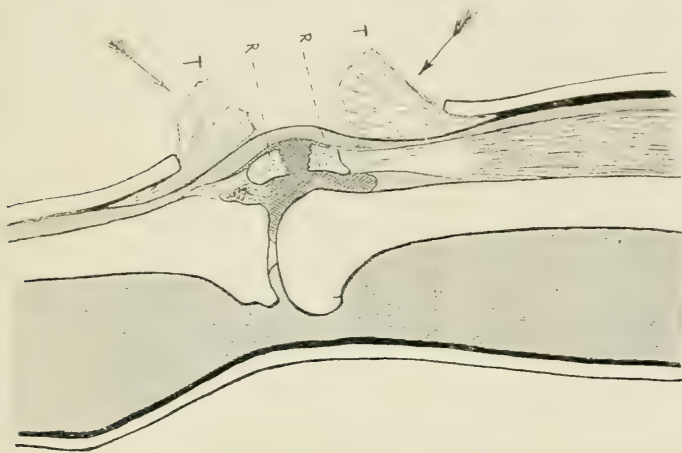


Fig. 1090. — Fracture of the patella. Treatment. The method of placing the squares of wadding under the upper and lower edges of the opening; the bandage in spica, by compressing both fragments of the patella, will bring them together in the direction of the arrows. T. tampons or squares of wadding. R. R', fragments of the patella.

But what about the country doctor, suddenly called far away for an accident, the nature of which has not been specified, and finding on examination a fracture of the patella in an aged working man or peasant, perhaps alcoholic or diabetic?

Do you believe that this doctor will perform a surgical operation, suture or screwing, in a house more or less clean (rather "less" than "more")? Would this be the best treatment to apply in such a case? Would it be wise and safe?

I have found myself in this position several times, and I have applied the following treatment with very good results, without any

risk to the patient. I therefore advise you to use it : construct a plaster knee-piece from the trochanter down to the malleoli and even to the toes (v. fig. 656, p. 613); 15 minutes after the setting of the plaster, make an opening on the anterior face of the apparatus, opposite the patella, this opening exposes the limb for 3 or 4 inches above and below both fragments; apply squares of wadding arranged in horse-shoe shape, between the fragments and the edge of the opening (above and below), to try and bring the two fragments nearer together; with a few turns of Velpeau bandage applied over this tampon in the manner of a figure 8, the approximation of the fragments is easily effected and their contact is, or nearly always is, obtained.

Verify the compression and renew it at least once a week. After 50 days the patient may be freed from all apparatus.

By this method we have been able, in fractures with a separation of 2 or 3 inches, to reduce it to a few millimetres. And the functional result has been perfect, or nearly so¹.

B. — Fractures of the Oleocranon

(Refer to p. 85.)

In the same way we can treat fractures of the oleocranon by a plaster apparatus, opened at the region of the fracture, and allowing of a wadding compress which brings the superior fragment in touch with the inferior one.

It will be sufficient here to press on the superior fragment; but it is safer to place a tampon between the inferior fragment and the edge of the plaster, to prevent sores.

Theoretically, it seems preferable, to ensure the contact of both fragments, to plaster the limb in complete extension; but in complete extension the wadding compression would be ineffective. All **things considered**, we prefer to flex the limb slightly, as is shown in fig. 1091.

Here again we have obtained very good results by the application of this treatment.

1. Among many others, I can mention the case of an old alcoholic beggar woman, picked up drunk in the street; I found a fracture of the patella with a gap of two inches between the fragments. — And two months after our treatment she could walk without any assistance.

Here is another example : an ecclesiastic 72 years old who, a year after a fracture of the patella (treated by us), could fulfil his duties and even kneel down.

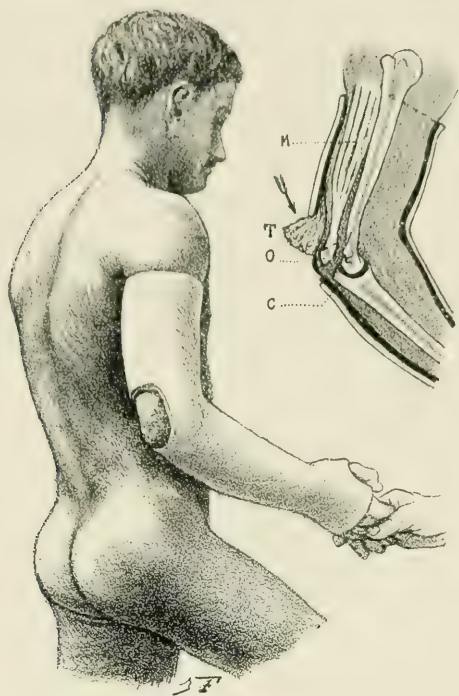


Fig. 1091. — Fracture of the olecranon. The apparatus. The elbow is immobilized in slight flexion (15 to 30 degrees) ; an opening is made in the plaster, on the posterior aspect of the arm, to allow of the compression with wadding of the superior fragment. This opening exposes in its lower part the point of the elbow.

Fig. 1092. — Explanatory schema of the compression : squares of wadding are introduced underneath the superior edge of the opening ; these squares project and form a pad on the superior 1/3 of the orifice ; the Velpeau bandage holds them firmly and thus the osseous fragment, which was pulled upwards by the triceps, will be brought down in the direction of the arrow. — M. Muscle and tendon of the triceps, to the extremity of which the broken olecranon remains attached. — T. Tampon of wadding for compressing the broken olecranon. — O. Broken olecranon. — C. Ulna.

C. — Fractures of the Neck of the Femur. A practical and safe treatment.

(Refer to p. 86.)

Of all the fractures of the limbs, none, I think, give more trouble and less satisfactory results than fractures of the neck of the femur. Generally they are treated by Hennequin's or Tillaux' extension.

But this extension, to be effective, must be well done and carefully watched over, which is here difficult, but above all, whatever is done, it is too often inadequate in giving us a good result. — Indeed, if the fragments are displaced and impacted (v. fig. 1106), extension can do nothing. And if this impaction does not exist, if the fracture is very complete (v. fig. 1108) extension does not succeed in correcting exactly the different factors of deviation, especially the shortening, often very marked, and the external rotation, always so



Fig. 1093. — Normal hip-joint.

intractable, of the inferior fragment, the results of this method of treatment are in the end very poor and truly bad.

Lastly, the treatment by extension is unfit for many patients, for all those whose great age or bad visceral conditions prevent them from maintaining for so many weeks the recumbent position.

From all this, one understands that fractures of the neck of the femur (which unite so badly when they unite at all) are the scarecrow of practitioners. And this is why I would like to mention the simple and practical treatment that I have applied for several years and which gives infinitely superior results to those given by extension.

It can be applied to all anatomical and clinical varieties of fractures of the neck; extra or intra-capsular, or mixed fracture, or epiphysial detachment (v. fig. 1093 to 1100).

A Word upon Diagnosis.

Epiphysial displacement is often mistaken at its onset for hip disease and, later on, after the union of the bone, with a coxa vara (consecutive deviations of other varieties of fractures of the neck are also mistaken for coxa vara).

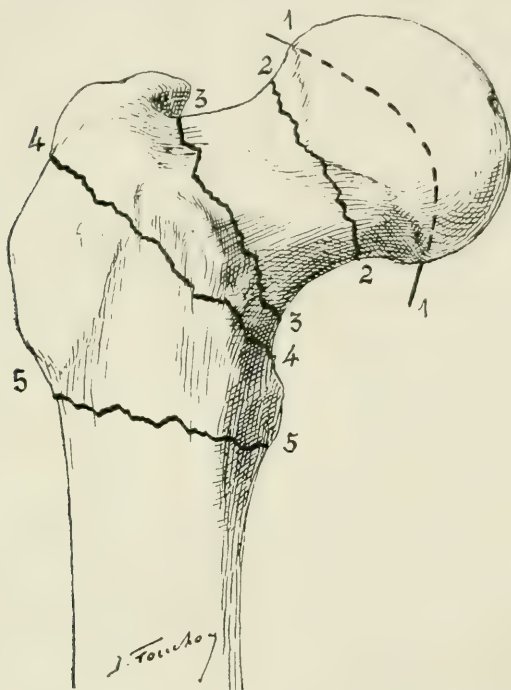


Fig. 1094. — Different varieties of fractures of the neck of the femur; 1, epiphysial detachment; 2, intra-capsular fracture; 3, extra-capsular fracture; 4, trans-trochanteric fracture; 5, sub-trochanteric fracture.

But the diagnosis between a detached epiphysis and a commencing hip disease is easy, as, besides the indications furnished by the X rays, which always show distinctly the detached epiphysis: besides, also, the history of a traumatism, an appreciable shortening of the inferior limb is always noticeable in the case of detachment; whilst in hip disease at the onset, on the contrary, the affected limb is slightly longer or at least as long, as the sound one.

As for the diagnosis between coxa vara and a badly united fracture, it is arrived at by a history of traumatism and by a sharp notch on the superior edge of the neck noticeable by the X rays, on a level with the old mark of the fracture.

And yet I have known cases where this mistaking an old detachment of the epiphysis for a coxa vara has been made by surgeons who had radiographic installations at their disposal.

Nevertheless, the diagnosis is easy, for one has only to remember that the direction of the external fragment of the neck is obliquely outwards and upwards and the trochanter markedly hypertrophied in the case of coxa vara (fig. 1101), whilst there is obliquity down-

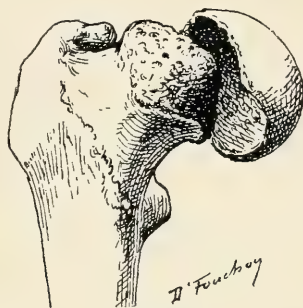


Fig. 1095. — Detachment of the epiphysis.

wards and outwards of the external fragment of the neck, without hypertrophy of the trochanter, in cases of detachment of the epiphysis or of badly united fracture (v. fig. 1102).

As to the **immediate** diagnosis of fracture of the neck, it is **generally** easy. You are called to a patient who, after a severe fall, has been unable to get up, and complains of the hip. He is generally an old person. You find the lower limb in external rotation and shortened by 2, 3, 4 cm., a shortening easy to ascertain if you compare the respective level of both heels.

It is at once apparent that there is no fracture of the leg, nor of the femoral diaphysis; and you notice also that there is no luxation of the hip, the head of the femur being well in its place, at the fold of the groin, beneath the artery (see p. 714, fig. 789, for the diagnosis of luxation of the hip).

The trochanter is, however, as in luxation, displaced above Nelaton's line.

It is a fracture of the femoral neck; moreover, you will generally

feel the characteristic crepitus and an abnormal mobility between the fragments. Nevertheless, there are cases where the diagnosis is difficult, as in fractures of the neck following a relatively slight traumatism, and also in cases where the patient has not only been able to get up but even to walk, and to walk for a certain length of time. Such cases have been known, exceptionally, it is true, in adults, but

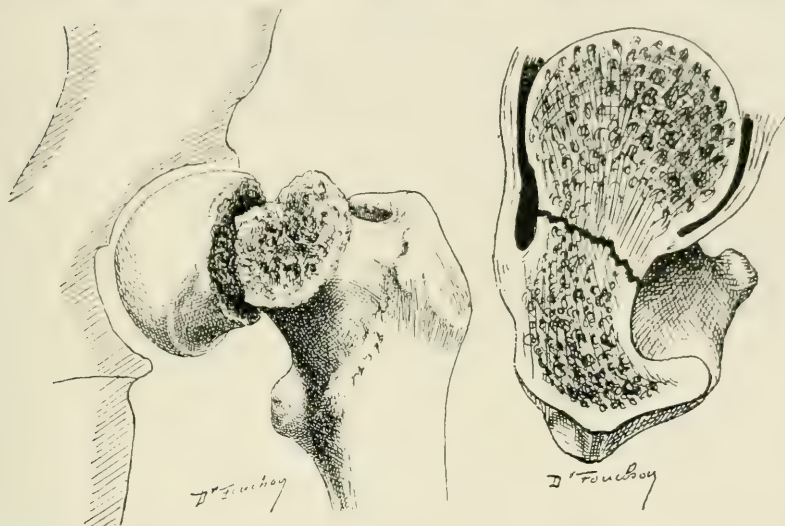


Fig. 1096. — Respective position of both fragments in an intra-articular fracture (from a radio). Fig. 1097. — Mixed fracture — intra and extra-capsular.

often-times in children (for example, the patient in fig. 1111), and even when the fracture was *not* impacted. You must bear these cases in mind, so that, on noticing the possibility of walking in a patient suffering from the hip, you do not come to a rash and definite conclusion that there is no fracture of the neck. So even, in such cases (after a traumatism of the hip), you will have to look for the signs of epiphysial detachment or of fracture of the neck, always possible. If you can use the X rays, the diagnosis will be very easy, but, failing the X rays, you can also determine it by exercising somewhat more attention and carefulness in your examination of the hip.

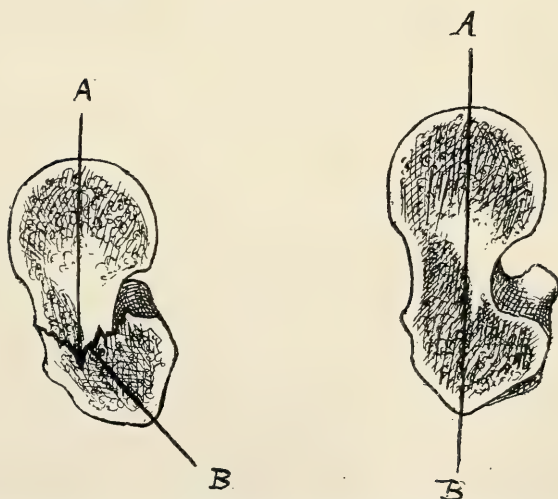
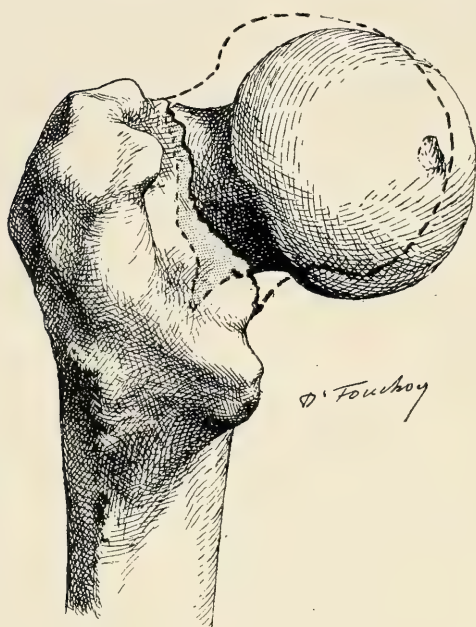


Fig. 1098, 1099 and 1100. — Extra-capsular fracture with impaction of the fragments. The Merkel spur penetrates into the spongy mass of the trochanter and can even burst it; the axis of the neck forming a broken line at an angle with the digital fossa.

Outline of the Treatment.

It consists simply in doing for fractures of the neck of the femur¹ what we do for an ordinary fracture of the limbs, namely : immediate



Fig. 1101. — To establish the diagnosis between “essential” coxa vara and a badly united fracture of the neck. — 1. Here (fig. 1101) is an essential coxa vara. The whole of the neck has given way; its superior edge is oblique, downwards and inwards. The dotted lines show the normal shape of the femur (v. fig. 1102).



Fig. 1102. — 2. Traumatic coxa vara. The épiphysis only has slipped down : the superior edge preserves its direction upwards and inwards (v. fig. 1101).

1. And also for fractures of the shaft of the femur.

reduction (with or without chloroform) followed by the exact maintenance of the reduction by means of a large plaster (exactly similar to the large plaster for hip disease). With this apparatus the patient keeps at rest in the recumbent position, if this presents no inconvenience for his general health (as is the case in children, adolescents, and adults): but he can also stand and walk with the help of crutches if a prolonged decubitus presents danger for him (as in aged persons, and

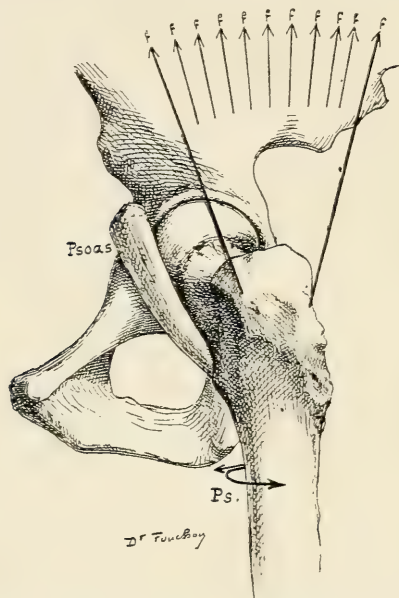


Fig. 1103. — Schema showing the action of the muscles: the glutei muscles pull the trochanter upwards, the psoas and the obturators and gemelli produce external rotation.

in certain emphysematous and cardiac adults). Note at once that the thigh must be plastered in abduction of 30° to 45° , for this marked abduction facilitates greatly the immediate maintenance of the reduction, and the good ulterior function of the limb.

This "large plaster" (reaching from the umbilicus to the toes) is to be worn 7 or 8 weeks. — After this time it is replaced by a "small plaster" reaching from the umbilicus to the knee only (applied in an abduction reduced by half) — and with which the patient walks, resting on his foot. After 5 or 6 weeks (altogether

3 or 4 months with the plaster) the patient is freed from all kind of apparatus. There is then no more to be done except massage and walking exercises, as after an ordinary fracture of the leg.

On the whole, it is an easy treatment, possible for everyone, as all doctors know how to set a fracture, and as all know today how to construct a plaster for hip disease. (There will be found, p. 426 to 433, a full explanation, illustrated by figures, of the different stages of the technique and of the construction of the plaster).

This said, let us enter into the details of the treatment of fractures of the neck of the femur.

1st. Reduction

Reduction, as in other fractures, can be effected without the use of chloroform, although, of course, by using it your work would be greatly facilitated, and at the same time your patient would be spared all pain. (If, then, neither you¹ nor your patient² have good reason for avoiding chloroform, use it).

The Manœuvres for Reduction

The direction of the manœuvres to be performed is given by the direction of the existing deviation and by analysis of the several factors of the deviation (v. fig. 1103 and 1104).

We must correct :

- a) The shortening;
- b) The external rotation;
- c) The abduction.

To do this, we will have to pull on the leg and thigh, and to carry it into internal rotation and abduction (abduction of 25° to 40°, as we have said).

Traction. — If it is to be really effective and accomplish reduction, we must first immobilize the upper fragment, i. e. the pelvis; failing this, both fragments will be pulled downwards at the same time by the traction exercised on the affected leg, and we run the risk of not correcting the abnormal relative position of these fragments.

1. That is, if you have the assistance of a colleague knowing well how to administer chloroform (see this technique, p. 109).

2. That is, if he is not too old, nor too fat, nor too emphysematous, nor a confirmed cardiac.

To obtain fixation of the upper fragment, proceed in this way :

The patient being held under the arms by one or two strong assistants (not necessarily medical men), another person pulls strongly upon the sound leg downwards and outwards, in an abduction of 40° or 50°. The purpose and the effect of this manœuvre is to lower this side of the pelvis of the patient and, consequently, to raise, by a reciprocating movement, the affected side of the pelvis, as well as the

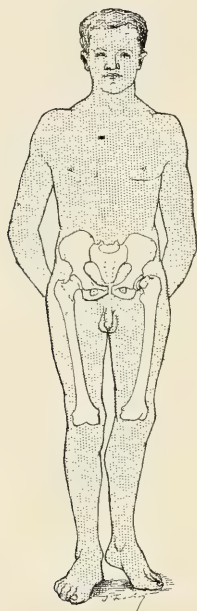


Fig. 1104. — Shortening in external rotation in intra-capsular fracture of the femur (left).

upper fragment of the fracture; at least it prevents this upper, or rather, internal, fragment, from being lowered at the next stage, when the affected leg will be pulled on to reduce the fracture.

Moreover, and with this same purpose of fixing the superior fragment, a second assistant pushes in an upward direction upon the ischium of the affected side; or, better, you may pass the loop of a woollen hank round the ischium and the upper fragment, the other end of the hank being fixed to the head of the bed or to a table (v. fig. 1105).

Then only you proceed to reduce the fracture, whilst another strong assistant pulls on the foot and leg of the affected side.

He must pull firmly downwards and outwards (up to 30°, 40° or 50° of abduction) imparting to the foot a movement of internal rotation to correct the existing external rotation, whilst you yourself, placing one hand upon the trochanter, will see that the reduction is effected; you aid this by pressing upon the trochanter with one hand,

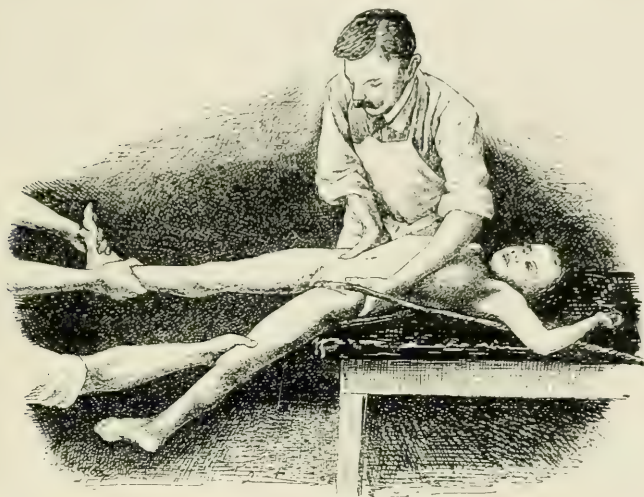


Fig. 1105. — Manœuvre for correcting a fracture of the neck of the left femur. The affected leg (left) is brought into abduction, internal rotation and super-extension. (Traction performed on the right foot ensures counter-extension). So then (the patient lying on his back) the counter-extension is effected: 1st by the assistant pulling on the sound foot; 2nd by another assistant immobilizing the pelvis; 3rd by a woollen hank placed in the fold of the groin on the affected side. The correction is effected by the surgeon pulling on the affected foot and knee; he brings the femur into abduction, internal rotation and hyper-extension, and thus gives it an inverse position to that which the traumatism had produced, as illustrated in fig. 1104.

whilst the other bears upon the affected knee to accentuate the correction of internal rotation and abduction.

As soon as reduction is obtained, you control and verify it again by direct palpation of the hip¹ and by very exact and, if need be, repeated measuring of the thigh: the measuring tape being stretched from

1. Or better still by radioscopy or radiography, when it is practically possible.

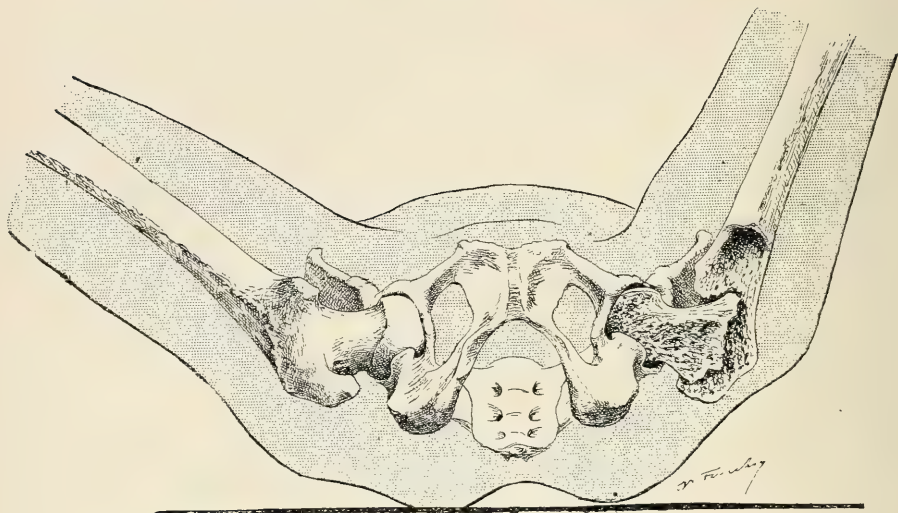


Fig. 1106. — Correction in the case of impaction of the fragments. The affected femur has been placed in flexion, then in abduction: this movement is limited; the head and the neck are fixed against the posterior border of the cavity. On the right, the sound side, forced abduction.

the iliac spine to the apex of the patella on both sides, alternately, whilst both legs are maintained symmetrically, in the same degree of abduction.

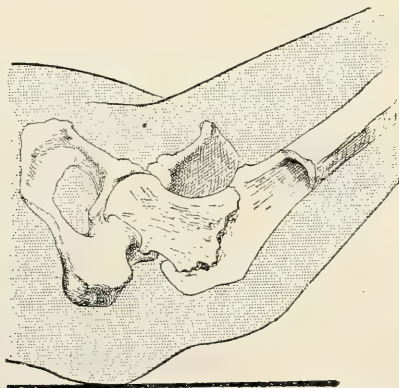


Fig. 1107. — Correction (continued) in the case of impaction of the fragments: by forced abduction the penetration of the fragments is done away with.

Two remarks about reduction : *a*) When it is a case of fracture with impaction of the fragments (when the fracture is generally incomplete), it is better not to pull too hard and to avoid a rough separation of the fragments. No, one must pull, twist, and manœuvre, only as far as is necessary to obtain a complete correction of the

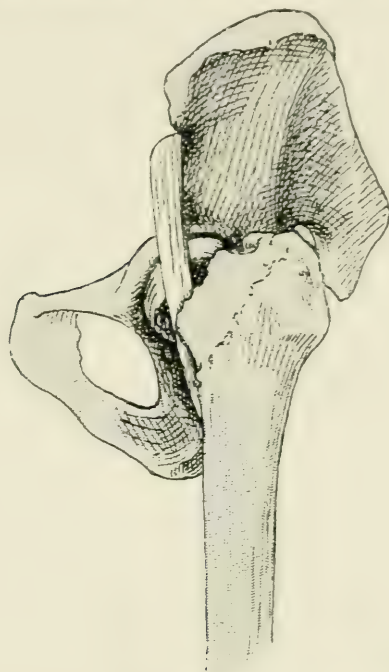


Fig. 1108. — In extension, the cord formed by the psoas glides into the interstices produced between the neck and the head of the femur, gaping in front; these muscular fibres are an obstacle to the approximation when reduction is attempted by direct pulling on the leg (fig. 1109). In certain fractures with great shortening, there is an interposition of tissues between the two fragments.

present deviation, going, it is true, up to a certain degree of hyper-correction.

One must then only perform the manœuvres necessary for placing the knee in an internal rotation of 10° to 15° and in an abduction of 25° to 30°.

Here is a good manœuvre for undoing impaction of the fragments (v. fig. 1106 and 1107).

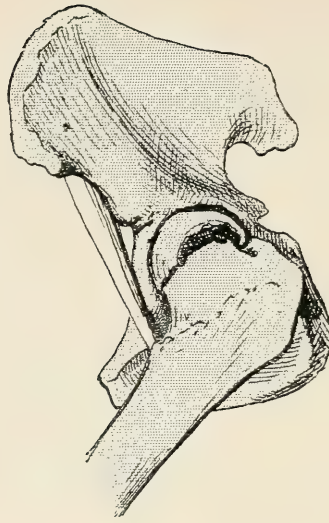


Fig. 1109. — In this case (v. fig. 1108), to reduce the fracture, it is sufficient to flex the thigh to a right angle; by this movement the psoas, carried away by the small trochanter, leaves the line of the fracture. — After this, the thigh is brought into extension and abduction.

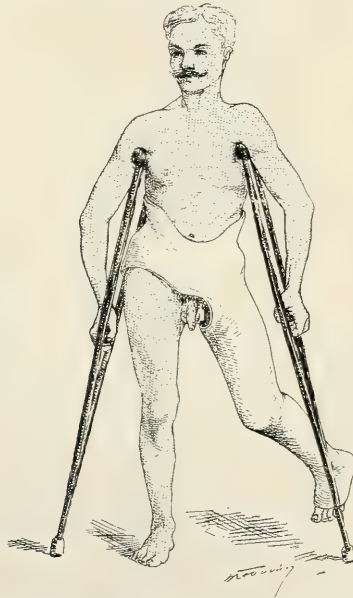


Fig. 1110. — The large plaster for the lower limb, to be applied as soon as the fracture is reduced. The apparatus allows of walking with crutches (in patients who could not, without danger, remain continually and for many weeks, in the recumbent position).

b) When, on the other hand, it is a case of a very complete fracture, with a very marked gap between the fragments and a very noticeable shortening, 3 cm. or more, when one feels (by palpation) the trochanter and the lower (or rather external) fragment above and in front of the femoral head, the fragments are often separated by the



Fig. 1111. — Gaston D., 15 years old. Radio, showing the fracture which has completely separated the head from the femoral neck; the broken face of the neck faces forward, perpendicularly to the broken face of the head (note that this patient had not ceased walking for a single day, and that he came to us 7 months after the fall which must have caused the fracture; and lastly that he came with a diagnosis of hip disease).

fibres of the capsule or of the muscles, and reduction can only be obtained by direct traction of the thigh in extension (v. figs. 1108 and 1109).

You must begin by flexing the thigh, reaching sometimes 90° of flexion; this will relax the soft interposed fibres, liberate the fragments and allow you to succeed in replacing the lower (or external) fragment of the neck in contact with the upper (or internal) fragment.

You verify by palpation that the coaptation of both fragments is obtained, after which, whilst you maintain it with one hand, with the other you carry the knee 45° outwards, until you feel you are stopped by the assistant who pulls on the leg and the foot. It is especially in



Fig. 1112. — The same child, 5 weeks later: radio taken through an opening in the plaster. The image is very like the one of a normal femur in internal rotation. Functional and anatomical cure perfect (this cure is all the more remarkable seeing that the fracture had been ignored and left wholly unattended for 7 months).

such cases that you have to carry the thigh as far as possible outwards, up to 45° ; until you feel you are stopped by the contact of the superior edge of the neck of the femur with the superior edge of the margin of the acetabulum (this happens at or about 45° of abduction); this position is very favourable, as we have said, to the exact maintenance of the reduction.

2nd. Maintenance of the Reduction. Immobilisation

The reduction being obtained and preserved (all your assistants retaining their position as indicated above), you begin to construct the plaster which must very exactly maintain the reduction. It is, let us repeat it, a large plaster as for coxitis, such as all practitioners can easily make by following the technique already explained and illus-



Fig. 1113. — Tracing from radio of fig. 1111 (we give this tracing so as to render the lesion more clear to all).

trated in this book, and which it would, therefore, be useless to describe again here (v. fig. 1110).

As soon as the last strip is applied, and before the plaster has set, the patient is gently removed from the pelvic support and carefully placed on the table, whilst your assistants still maintain the given attitude. Place one hand on the seat of the fracture to ensure (through the plaster) its exact reduction, embracing the plaster above the trochanter with the half-opened hand, whilst with the other, placed on the knee, you make certain of its good position, increasing or diminishing as the case may be, the abduction and rotation already obtained.

The plaster is modelled above the iliac crests and inside the iliac spines, and on a level with the ischium (as represented on p. 430 and 432).

And you and your assistants will keep your places until the plaster has set. Then you have only to open the plaster round the umbilicus, the genital organs and the toes, as you know.

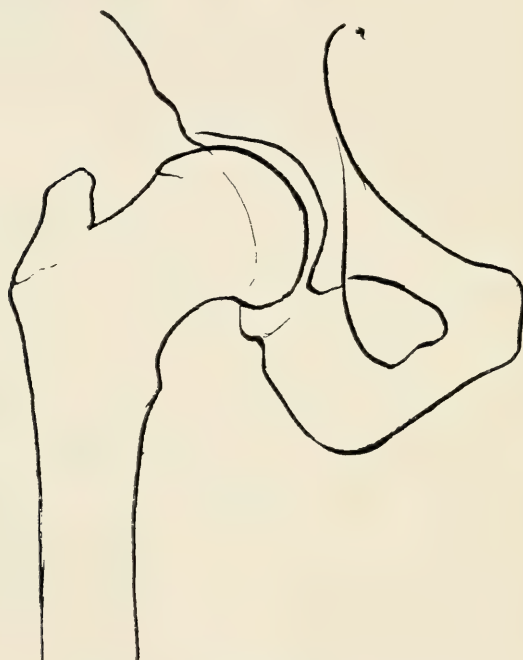


Fig. 1114. — Tracing from radio of fig. 1112.

One more remark on the construction of the plaster. It is easy to construct a plaster on a thin patient, but it is not so easy on a stout or fat subject; however with the expenditure of more time and care you will succeed.

And the benefit to be derived from the plaster is too great to dispense with it in any case.

Perhaps you will object that several assistants are necessary to apply this treatment for correction and tension. But, I repeat, those assistants need not be surgeons; you can employ any of the friends

of the patient: you can easily explain to them what they have to do.

In reality the treatment is simple, at least in the majority of cases: nine times out of ten all goes on well: reduction and application of the plaster. When the plaster is applied, everything is finished.

The plaster will produce about 3 months later a perfect (or nearly so) anatomical cure and a good functional result. As I said, you can assist it with massage, exercises, baths, etc.

The case here illustrated (v. fig. 1111 to 1114) of a fracture of the neck in a young man 15 years old, is an example, among many others, of an ideal cure obtained by the treatment I have just explained.

All which precedes refers to **recent** fractures of the neck of the femur.

Treatment of OLD Fractures of the Neck of the Femur.

1st. case. The fracture is already united, but the functional result is bad.

A patient (whose fracture of the neck dates a few months or a few years) comes to you because he is very lame; you notice a marked shortening and a strong deviation of the leg in external rotation and abduction. He asks if you can do anything for him. Yes, you can correct the shortening and the bad position and, consequently, the lameness.

Proceed with the examination of the patient, under chloroform if possible. The pelvis being firmly held by two assistants, one of whom maintains the sound thigh bent on the abdomen, the other fixing the iliac bone of the affected side (one hand grasping the iliac wing and the other the ischium), you try to separate the two fragments of the fracture by alternate movements of flexion and extension of the thigh.

a) It happens indeed, in certain cases, that the union being not very firm, the two fragments may be thus separated, which you will easily perceive by direct palpation of the neck; you will notice a certain mobility and crepitus produced by the friction of the two sundered fragments of the bone.

As soon as this mobility is produced, bring the femur into the correct position or, rather, into hyper-correction, that is, into internal rotation and marked abduction.

Then you fix the correction with a plaster of the same pattern and for the same length of time as for a recent fracture.

And here also, with this plaster, the patient will be kept at rest or will be allowed to walk as in the cases specified in our study of recent fractures.

b) But, if you have not succeeded in loosening the fracture after 5 or 6 vigorous movements of flexion and extension, do not persist; have recourse to a slight osteotomy to induce the breaking of the bone at the level of the old fracture; I say slight, because it affects only half or two-thirds of the thickness of the bone, the remaining being broken by osteoclasia. This also is slight; it should be sub-cutaneous and hardly any hæmorrhage will occur; all patients will sustain it well.

I have done this a dozen times for badly-united fractures of the neck which had left lameness or grave incapacity, and I have obtained each time a perfect (or nearly perfect) anatomical and functional result.

The Technique of Linear Osteotomy of the Neck.

On what part of the bone will you perform it?

At the level of the fracture, or, more simply, above and inside the great trochanter, close to it, on the most external part of the neck.

In what direction? Not exactly vertically, but obliquely inwards and downwards; the osteotome will follow closely the direction of the line bisecting the angle formed by the diaphysis of the femur and the neck, or, in other words, you will direct the osteotome towards the middle of the internal aspect of the thigh (v. fig. 1115).

The patient lying on his sound side, you mark the superior edge of the great trochanter, and above, and quite near it, you make a vertical cutaneous incision of 1 cm. or 1 cm. $\frac{1}{2}$ barely. Introduce the osteotome parallel with the incision and drive it in until you touch the bone.

Then you twist the osteotome transversely, that is, perpendicularly to the axis of the neck, and you direct it, as I said, towards the middle of the internal aspect of the thigh.

With the mallet, you drive it in up to the centre or to two-thirds of the thickness of the bone, which you reach after two or three blows in a child, and five or six in an adult. With a graduated osteotome, you easily estimate what depth you have reached.

It is very easy to avoid the crural nerve and the femoral vessels in front, and the sciatic nerve behind, to do which, be careful not to lose contact of the bone with the cutting extremity of the instrument,

and do not let it slant forward or backward, that is to say, maintain the superior and inferior edges of the osteotome in a plane parallel with the plane formed by the axis of the diaphysis and the axis of the neck (v. fig. 1116).

As soon as you feel (or see on the graduated osteotome) that you have reached half the thickness of the bone, you withdraw the osteotome and place a tampon over the small cutaneous incision; then you perform osteoclasis, to effect the breaking (which has been facilitated by the osteotomy).

To perform osteoclasis, the pelvis is held firmly by one or two



Fig. 1115. — The technique of linear osteotomy in badly-united fractures of the neck. This illustration shows the direction to be given to the osteotome. The osteotome is held by the surgeon in such a way that its direction prolonged would reach the middle of the internal face of the thigh. — Two-thirds of the thickness of the bone only are cut by the osteotome. The remaining third is broken by osteoclasis (v. following figure).

assistants, and the thigh is brought into strong adduction by another assistant, as if one wished to exaggerate the present deviation. Persist vigorously until you hear creaking; then, at once, you bring the thigh into an inverse position of abduction, of about 30° , and of internal rotation, that is, into hyper-correction.

There is no need to suture the insignificant skin incision.

Immobilization in this position with a large plaster, and rest or walking, according to the case. The subject may leave his bed a few days after this very slight intervention.

2nd. case. The fracture of the neck of the femur is not united.

A patient comes to you 6 months, 1 year, 2 years, after fracture of the neck has taken place.

He has a pseud-arthritis, he suffers pain, he is helpless and asks if his condition cannot be improved.

a) First of all, endeavour to obtain solid union after having made

a **non-surgical refreshing** of the fragments. To effect refreshing, take hold of the thigh, the pelvis being fixed, mobilize the two fragments during several minutes, or, rather, rub them one against the other, after which you secure them in a plaster. And it happens, when the fracture is recent (of less than one year) that osseous union is thus obtained. I could give several instances.

You wait for consolidation for 4 or 6 months. But at the end of this time, if it is not effected, you can no longer hope for it.

What will you do then?

Surgeons **who favour intervention in cases of fractures** will suggest either the resection of the head, or the surgical erasion of

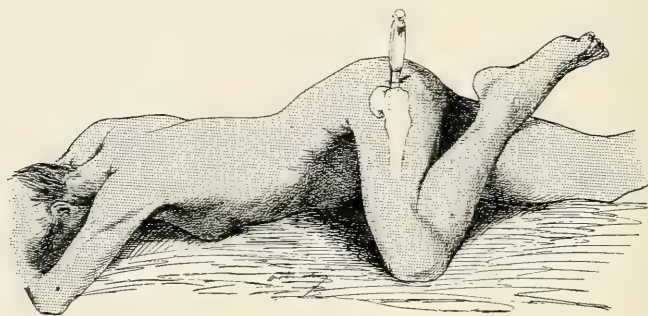


Fig. 1116. — The technique of linear osteotomy (*continued*). The downward direction of the osteotome is that of the axis of the body of the diaphysis (the superior and inferior edges of the osteotome remain parallel to the plane given by the axis of the diaphysis and that of the neck of the femur).

the two fragments, followed by continuous extension according to Hennequin's method.

But these operations are of real gravity (which was not the case with the slight osteotomy mentioned above) and, moreover, their benefit is very uncertain. Indeed, the resection of the head is bound to yield a very indifferent orthopædic result and even a very marked lameness; we can succeed better, as we shall see, with a non-surgical treatment.

As to the value of the surgical refreshing followed by continuous extension, and the value of pinning, without wishing to ignore them, I will give two observations that came under my notice, upon patients operated upon in Germany; they will show that one must not expect too much from these operations.

The first patient, a Portuguese, underwent pinning of the two

fragments. At his second walking exercise, the pins broke, he relapsed, and would not hear of a new operation : he remains an infirm invalid, with those two foreign bodies still in his hip.

The second patient, a Frenchman, 30 years old, was also treated by pinning of both fragments, under Hoffa, but after the operation he suffered great pain and walked very badly. (I was able to recognise here that there was no union, and that both fragments were playing one over the other, notwithstanding the presence of the pins). So much so that he insisted on the removal of the pins. This was effected by a surgeon of one of the hospitals at Paris, who then refreshed the fragments by the open method; after that, he had continuous extension, instituted and superintended by Hennequin himself.

But the hoped-for consolidation was not effected after this rather serious surgical operation.

Then what is to be done in such cases? Well, I do not hesitate in advising you not to have recourse to resection of the head and refreshing; these operations ought, if they must be done, to be left to surgeons who are specialists in fractures — but need they be performed? for I myself do not believe that these surgical treatments are to be preferred to the benign non-surgical method which I am going to describe.

This method consists in an anterior transposition of the inferior fragment of the fracture by manœuvres similar to those we orthopædic surgeons perform for congenital luxations of the hip of old standing, when we merely wish to better the position of the femoral head and give it a bony resting point in front, without seeking real reduction. In the case of fracture, you leave the superior fragment where it is, but you carry the thigh in hyper-extension, abduction and internal rotation, so as to afford the inferior fragment a good strong fulcrum on the pelvis in front¹. And thus you will obtain a functional result superior altogether to that obtained by surgical methods, and without any of the risks involved in those methods.

Summary and Conclusions

In a word, this is what must be, in my opinion, the treatment of fractures of the neck of the femur :

1st. *For recent fractures* : Correction of deviation and placing the limb in an abduction of 30° to 45°, with internal rotation of 10°

1. You will find all the details of this technique on p. 816 and following.

to 15°. After that, immobilization in a plaster (as for coxitis) with which young and healthy patients will remain in the recumbent position, and with which old patients will be allowed to stand and to walk with the help of crutches.

2nd. *Old Fractures with Loss of Power.*

A. If union is already produced.

a) One endeavours to undo it by the non-surgical mobilization of the two fragments; one replaces the limb in good position and in a plaster..... rest, or walking, according to the case.

b) If the attempt at mobilization does not succeed, sub-cutaneous supra-trochanteric osteotomy; partial osteotomy of two-thirds of the thickness of the bone, followed by rupture (osteoclasia) of the other third; after that, placing in good position and in plaster.

B. If the fracture is not united.

a) Mobilization, to try to obtain a refreshing (by non-surgical means) of the two fragments, then immobilization in a large plaster.

b) If this attempt at refreshing followed by 4 months in a plaster has not succeeded, instead of performing a surgical operation, always grave and often useless, one will be content with carrying the femur into an hyper-extension ¹ and an abduction of 45° so as to give the inferior fragment a good support on the pelvis in front. With a plaster the patient is allowed to walk. After 3 or 4 months in this position, the thigh is carried back in an abduction of less than 15°, maintained by a second and last plaster worn for two or three months.

With the above treatment, you will easily cure recent fractures of the neck of the femur. As to old fractures which have left a useless limb, you may obtain noticeable improvements, or even cures, and this by benign methods (which you may be assured will never occasion any harm); one cannot say as much for surgical methods ² practised in fractures of the neck of the femur.

1. Of about 15°.

2. Here are the statistics of two surgeons (the two who have had, perhaps, the greatest experience) in cases of fractures of the neck of the femur.

a) Lambotte, of Antwerp: out of 20 patients operated upon by him (screwing of femoral head) 3 are dead (1 of pneumonia, 2 of infection);

b) Pierre Delbet, of Paris: out of 26 patients operated upon by him (pinning) 4 died from incidental causes.

So much as to mortality, i. e. more than 15 per 100.

As to functional results?...

ON COXA VARA

Diagnosis and Treatment.

(What all practitioners ought to know)

The question of coxa vara is of interest to all practitioners, as you will see presently.

1st. *Case*. All of you are often consulted as to children 2 or 3 years old, who “*duck*” in walking. Do you know what is the matter? — A bad habit? — No. — A muscular weakness which (according to its form) may disappear with growth? — No.

It can be only one of two things; congenital luxation of the hip or... *coxa vara*,

2nd. *Case*. An adolescent (12 to 20 years) “*ducks*” or “*swings*” in walking (on one or both sides); here again it is a congenital luxation or *coxa vara* ¹.

3rd. *Case*. An adolescent comes to you for lameness² or for pains² in the hip or the knee: you think of coxitis, and indeed, most often it is a coxitis, but not always; it may be a *coxa vara*.

In those three cases you must then think of a possible *coxa vara*, and know how to frame its diagnosis and its treatment, for you may well imagine that the treatment will be entirely different according as it is a case of *coxa vara* or of luxation, and you would not be forgiven for such an error of diagnosis and treatment. You can avoid this error, thanks to the indications given on p. 629 and 643 ³. We wish to add just one word about the diagnosis between coxitis and *coxa vara*. There is one case where this diagnosis is nearly impossible without the help of radiography; it is the case of an adolescent who has been slightly lame, and has suffered at intervals for more than a year when first brought to you.

1. Nevertheless, the double oscillation of the trunk during walking could also be caused by a progressive muscular atrophy arrived at an advanced stage, but the diagnosis, in this last case, presents no difficulty.

2. Why, you will ask, are there pains and contractures in *coxa vara*? For the same reason that there exist painful muscular contractures which are seen in cases of flat foot in adolescents.

3. See p. 1031 for the diagnosis of *coxa vara* with deformity as a sequence of a fracture of the neck, united in a bad position (fig. 1101 and 1102).

What renders the diagnosis here very difficult is that a coxitis of over a year's standing generally produces shortening, and the trochanter may be thus above Nelaton's line : such a coxitis imitates exactly a coxa vara.

Clinical observations give, it is true, the signs of presumption for

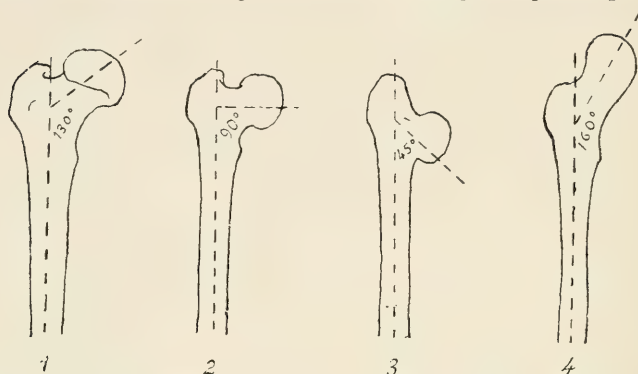


Fig. 1117. — *Normal femur*. The axis of the neck forms with the diaphysis an open angle (below) of about 130 degrees.

Fig. 1118. — *Coxa vara* (medium gravity). The angle formed by the neck and diaphysis is a right angle.

Fig. 1119. *Coxa vara* (very grave variety). The angle formed by the neck and diaphysis is of 45 degrees only.

Fig. 1120. — *Coxa valga*. The angle formed by the neck and diaphysis is of 160 degrees instead of 130 degrees, the normal angle. It is more rare than coxa vara and is often due to infantile paralysis, whilst coxa vara is rather due to rickets.

making the diagnosis (and you know them)¹, but the sign of absolute certainty must be sought for by radiography.

Prognosis and Therapeutic Indications.

What will become of the defective gait and functional trouble of coxa vara if they are not attended to?

a) *In very young children* they have been known to disappear spontaneously; but you must not rely upon that, and it is your duty to treat the deformities like other rickety deformations — namely : 1st, by the general and dietetic treatment of rachitis which you well know : milk diet, sojourn in a good climate, if possible at the sea-side;

1. If there is a fungous thickening round the hip, it is hip disease; if the parents can affirm that the affected limb began by being longer than the other one (before becoming shorter) it is hip disease, etc.

and 2nd, by local treatment consisting of rest and continuous extension of from 1 to 2 kilos., in abduction of 25° of the affected limbs.

This treatment is nearly always sufficient to cure coxa vara in very



Fig. 1121. — Left unilateral *coxa vara*. Shortening, position in adduction and external rotation.



Fig. 1122. — The gain to be obtained by cuneiform osteotomy (see text, p. 1055) is here made conspicuous.

young children, and to cause after 1 or 1 1/2 years, the “ducking” and “swinging” to disappear.

Keep to this, then, at least at the beginning, in nearly all cases.

One must reckon 1 or 2 years on an average, to obtain this functional cure. If it is not sufficient, you apply the following orthopedic treatment (you will even apply it from the beginning in grave forms of coxa vara, so as to gain time and make certain of the result): you place the thigh, or both thighs, according to the case, in internal

rotation of 15° to 20° and in forced abduction of 45° (performing, if need be, to produce this abduction, the distension, or rupture, or section, of the adductors of the thigh)¹ and you maintain this forced abduction for 3 months with a large coxitis plaster; after 3 months, do away with the plaster, but the young patient must still keep at rest for 2 or 3 months, during which the leg returns spontaneously to the normal position. After that, let the patient stand and walk (consequently 5 to 6 months of treatment altogether).

b) In adolescents :

Here again it has been said : the lameness and pains will pass off of their own accord, they will disappear at the end of the period of growth; patience, then, let us wait for that time.

And it is true sometimes, but not always, far from it in serious cases (in the same way as tarsalgia, scoliosis, or genu valgum in adolescents, do not always disappear spontaneously at the end of growth). And you are obliged to apply a direct treatment to the deformity. This is what you do for the several cases :

a) In slight forms (slight as regards lameness and functional troubles), you order rest and make continuous extension of the leg in an abduction of 20° to 25° , for 5 or 6 months.

b) In cases where lameness is more marked, you will apply the orthopædic treatment given above (adduction and large plaster).

c) In cases of severe lameness and functional troubles, you must seek for cure by surgical treatment.

In such cases, orthopædic treatment no longer suffices. Nevertheless, this is not absolutely so, and, if you are not too much pressed for time, you may try it, remaining at liberty, in case of failure, to have recourse to a surgical operation. I could give you instances of cases of very marked lameness with grave anatomical deformities, where the surgeon had suggested at the onset, as the only resource, an osteotomy, which the parents had firmly refused, owing to their fear of all kinds of surgical operations; they had asked the surgeon to apply exclusively orthopædic treatment. Well, the treatment sufficed in these patients to procure the functional cure (i. e. to suppress lameness) without succeeding, it is true, in giving anatomical cure; but is not, after all, functional cure the only cure that interests the patients and their parents?

1. See for details of these several techniques the chapter on hip disease, p. 449 and following.

Nevertheless, in such cases, do not rely on orthopedic treatment only; too often, in some cases of severe forms of coxa vara, surgical treatment is the only course justifiable.

What should this Surgical Treatment be?

What has not been proposed and done, as operations, against coxa vara? Some surgeons have gone so far as to resect the head and



Fig. 1123. — Normal femur. Its functional or effective height is measured from the highest part of the surface of the head up to the middle of the interline of the knee.

Fig. 1124. — Femur and coxa vara of traumatic origin. A B, axis of the neck after the traumatism; the angle of the neck with the diaphysis measures only 95 degrees instead of 130; there has been a bending or closing of the two points of the compass; hence, functional shortening. The cuneiform resection of the bone allows of opening out the two points, to give them a greater widening. The axis of the neck takes then the position A' B' and forms an angle of 130 degrees or more with the diaphysis; hence, functional lengthening. The coxa valga resulting from the operation makes up for the shortening caused by the sinking of the neck produced by the traumatism.

the neck of the femur, without remembering that the only result of this severe operation would be to replace the existing lameness by another lameness, generally more unsightly.

To-day, surgical treatment of coxa vara means in all cases, osteotomy; and the only point under discussion is whether it should be linear or cuneiform.

The first, *linear osteotomy*, is easier, quicker, and simpler; as it can be done by a sub-cutaneous route, it is hardly an operation. Keep to it if you are afraid of an operation on the femur by the open method.

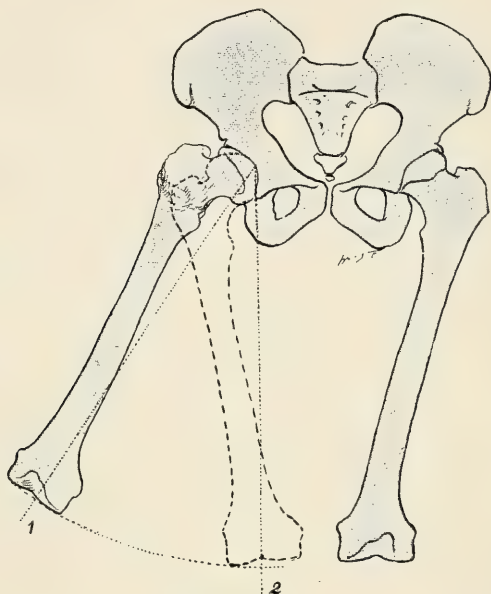


Fig. 1125. — Position after union : 1) Position when coming out of the plaster; 2) Position for walking: the knee will be on a level with the sound one and thus can be seen the lengthening produced by our intervention.

The bone is divided immediately below the trochanter (see fig. 1115 for the technique). The osteotomy will not be exactly transverse, but rather slightly oblique, downwards and inwards. Only two-thirds of the thickness of the femur are cut by the osteotome; the last third is broken by osteoclasis.

And thus very fair results are obtained.

But cuneiform osteotomy will procure a greater advantage; and it will remain a benign operation, provided it is made below the trochanter (even immediately below) and performed in 2 stages, at one month's interval, in double coxa vara. (It would no longer be benign,

or at least not surely so, in the reverse condition, that is, if it were made at the level of the anatomical neck, or in the thickness of trochanters, very much hypertrophied, and if it were performed at a single sitting on both femurs).

Is there really any need to demonstrate the greater gain which is obtained by cuneiform osteotomy?

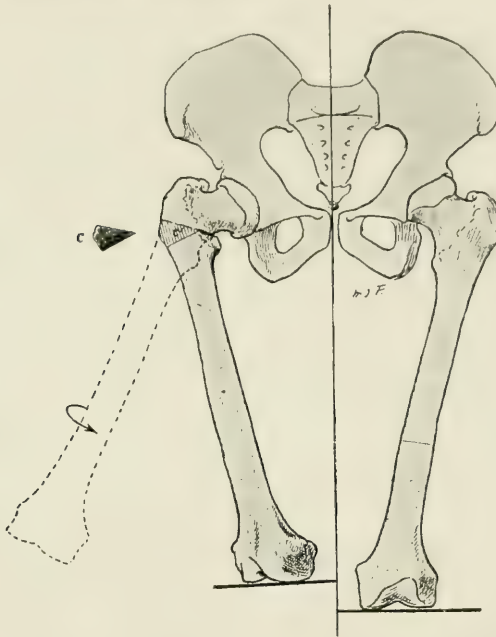


Fig. 1126. — Cuneiform osteotomy. C. osseous segment resected (shaded). See text, p. 1058, as to the dimensions to be given to the osseous wedge.) Position taken by the inferior segment after osteotomy.

Take your walking stick and suppose you cut out a wedge-shaped piece, here, at the level of the bend, but (fig. 1122) note quite through the stick, and so as to leave intact some of the wooden fibres. Suppose then that you *straighten the bend* as if you would give your walking stick a straight shape. It is obvious that by *thus opening more and more this compass with unequal points*, you will ensure for the extremities (A and B) a *greater and greater widening*.

You may try the experiment with cardboard. Cut the card

in the shape of a femur with coxa vara; remove from it a wedge at the place chosen and straighten it; it will give you the desired lengthening. The lengthening will be all the greater according as the primitive angle of the diaphysis and neck is more acute. Another conclusion is, that the more highly situated is the top of the wedge

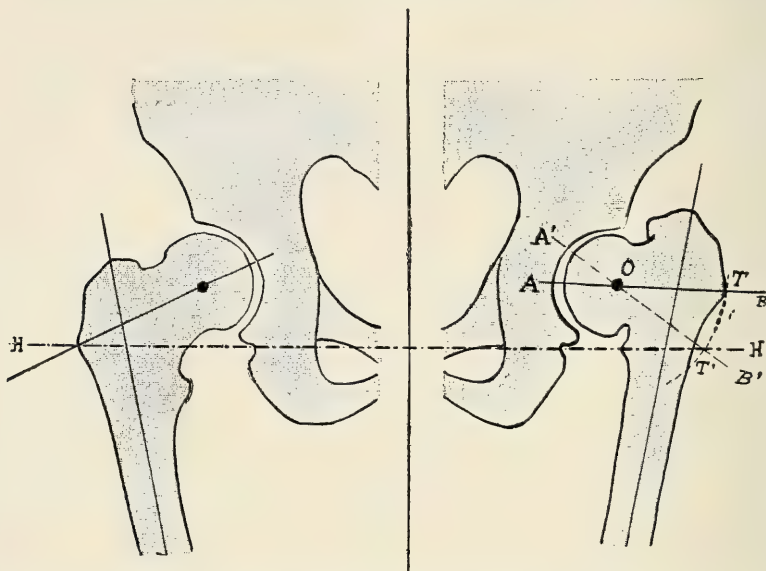


Fig. 1127 and 1128. — Determination of the angle of the bony wedge in initial coxa vara. In order to equalise the respective functional lengths of both femurs, the point T, marked on the left side, must be brought on a level with the corresponding point on the right leg, i. e. on the horizontal line H H, perpendicular to the axis of the body, namely in T'. To reach this new position, after osteotomy has been performed and union obtained, this point T will have described part of a circle (dotted lines) the centre of which coincides with the centre of rotation (O) of the head of the femur. A line joining the centre of rotation of the head to this new point T', will show the direction of the new axis of the superior extremity of the femur, after correction; the angle formed by the new axis with the old one, AOTB, will give exactly the angle of the bony wedge to be removed.

removed, the greater will be the lengthening. Calculation and the divider will equally lead you to the same result.

In practice then we will perform resection *immediately below* the neck. It is moreover the only method which allows us to obtain the most complete straightening of the femur. We will thus have a twofold advantage, the maximum lengthening of the leg, and the

minimum deviation of the line of the femur (and our operation will nevertheless remain practically as benign as if it were performed lower down).

Thanks to our intervention, the trunk will also lengthen by redressing itself. Before the operation, the child "ducks", the trunk bends on both sides, the vertical position is only transitory. When the point of the trochanter no longer abuts on the iliac bone, the vertical position of the trunk will rapidly become the one preferred by the child. The height of the shoulder will be raised by the amount of *the lengthening of the leg, of the straightening of the leg towards the vertical and lastly of the redressment of the trunk* (3 factors).

Evidently the principal benefit will be derived from the possibility of effecting the different movements.

And now a few words upon the operative technique.

Technique of Cuneiform Osteotomy

The patient is laid on the sound side, so that the external aspect of the affected hip is uppermost, in a good light.

A place for a vertical incision of about 5 or 6 centimetres, the *superior* extremity of which corresponds with Nelaton's line (which reaches from the iliac spine to the ischium) is marked out on the middle of the external aspect of the trochanter.

With the first stroke of the knife the skin is cut through; a second stroke carries the bistoury right down to the bone, which lies at a depth of 1, 2, 3 centimetres, according as the patient is thin or stout: the skin being chiefly separated from the bone by the panniculus adiposus, more or less thick, whilst there is only a *thin* layer of aponeurotic, muscular, and tendinous fibres overlying it.

A third stroke of the bistoury divides the periosteum for a length nearly equal to that of the cutaneous incision. Then with a flat rugine one loosens the two periosteal flaps; one goes as far as the two edges of the external aspect of the bone, so as to expose completely the full width of the femur to be removed. This width (or diameter) is from 2 to 3 centimetres, according to the age of the patient. You must have an osteotome, or a strong cold chisel, of about the same width, so as to enable you to make a rapid, neat, and clean section of the whole width of the bone.

What are the superior and inferior limits of the base of the wedge to be removed? They differ according to the case; fig. 1127 and 1128 give them: they are proportionate to the deviation and to the degree of abduction you wish to obtain. In a word, the angle of the opening

of the wedge must be equal to what is wanting at the angle of the neck and diaphysis in your patient, to attain the normal angle

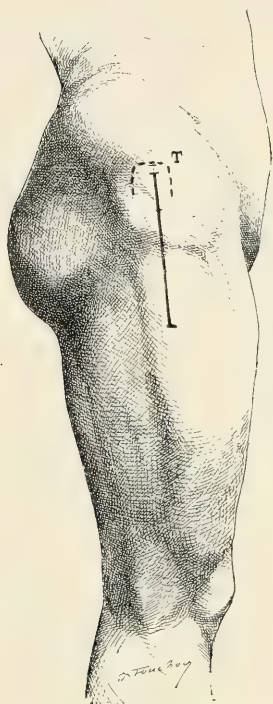


Fig. 1129. — Cuneiform osteotomy, incision of 5 or 6 centimetres, the superior extremity of which corresponds practically to Nelaton's line (a line which reaches from the iliac spine to the ischium).

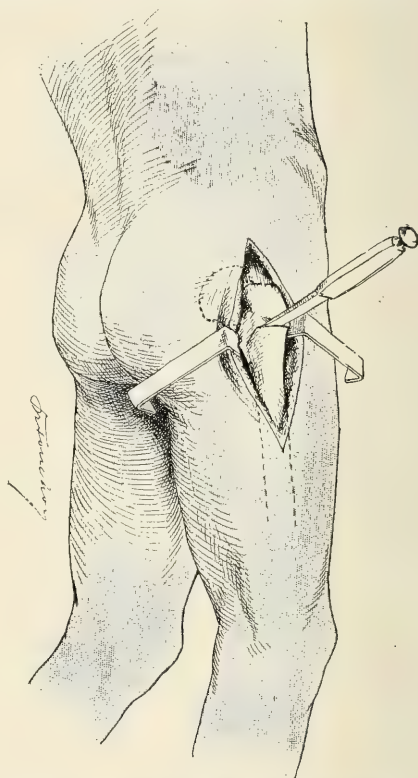


Fig. 1130. — Cuneiform osteotomy (continued). First incision of the bone. The cutting edge of the osteotome is placed on the point corresponding to the superior limit of the osseous wedge to be removed. The instrument is inclined downwards to about 25 degrees from the bony plane. A few strokes of the mallet bring it to the desired depth.

which is of 130° ; if the angle of the coxa vara is 80° the angle of the bony wedge will be $130 - 80 = 50^\circ$.

You could also find the proper angle of the osseous wedge by feeling your way — removing, little by little, slices of bone, until the abduction of the thigh reaches about 45° .

Or, more simply still, one may calculate (as this is generally sufficiently exact) that the *base* of the bony wedge will be slightly over 1 cm. (say about 1 1/4 cm., in a child under 10 years, and of about 2 cm. in patients over 10 years old).



Fig. 1131. — Cuneiform osteotomy (continued). Second osseous incision according to the desired angle. The cutting edge is placed in a line parallel to the 1st. incision. At the level of the inferior edge of the wedge it is inclined by 25 degrees, and cuts through the bone so as to meet the deep part of the first incision.

The *depth* of the wedge will be 1 1/2 or 2 cm. in children under 10 years; 2 1/2 cm. in those above 10 years of age.

Knowing these two dimensions (depth and width of the bony wedge) it will be easy to find the degree of obliquity to be given the osteotome (the superior and inferior cuts are oblique in an inverse

direction; but they must have the same obliquity in order that the two sections in the bone correspond exactly in the end.

Need I say that you must have an osteotome not only broad, but strong, as well as a good mallet?

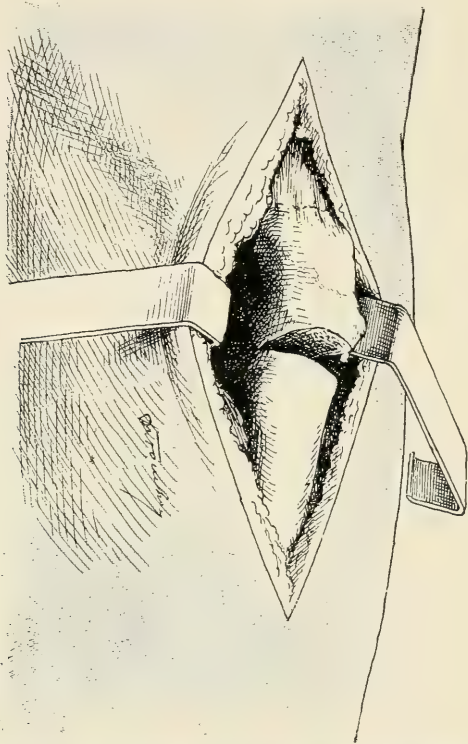


Fig. 1132. — Cuneiform osteotomy continued). The osseous segment, included by the two incisions of the osteotome, is removed; it remains only to complete the section by an osteoclasis.

The osseous wedge is removed, but the femur does not break yet; there still remain at its deep part some osseous fibres which act as splints; break them by osteoclasis. In order that they give way without a strain or traumatism to the patient, the osseous cut made by the osteotome must be of a depth of about two-thirds of the thickness of the bone.

As soon as the bone is broken (by osteoclasis, and you know when

it breaks by a crackling, always very distinct, you bring the two surface into contact.

Be aware that you will nearly always be hindered in this movement of abduction by the resistance of the contracted fibres of the adduc-



Fig. 1133. — A type of commencing *coxa vara*. Patient 12 years old; radio taken April the 5th, 1905. It can be seen that the angle formed by the axis of the neck and that of the diaphysis reaches hardly 88 degrees, instead of 130 degrees. The whole of the neck is bent down, on both sides, the characteristic sign of essential *coxa vara* (see fig. 1134, how the disease has progressed in 6 years, in spite of extension and relative rest, in spite of a general anti-rachitic treatment).

tors: but if you persist, if you renew these movements of abduction, you will find that the muscles will relax, little by little. You help this relaxation by massaging and kneading the muscles; if need be, rupture their insertions at the pubis¹.

1. See technique of this rupture p. 449 and p. 726.

Sometimes (rarely), the articulation of the hip is somewhat stiff or ankylosed and, in order to be able to move the femur outwards, you may have to break these osteo-fibrous adhesions as well; but you will achieve this by the same manœuvres of abduction which stretch, at the same time, the contracted articular capsule and the shortened tendons; continue the manœuvres of abduction as far as is necessary to effect the contact of the two refreshed osseous surfaces.



Fig. 1134. — The same child (7 July 1911) six years later; compare with fig. 1133 in order to realize how the deformity has increased during the last 6 years. The angle of the neck and diaphysis is only about 50° . The trochanter, very much hypertrophied, abuts against the iliac bone in the movements of abduction (see fig. 1135).

After that, you immobilise the thigh in an abduction of 45° ; but previous to that, it goes without saying, you have made the toilet of the wound, removed all the small osseous debris, ensured hæmostasis and sutured the skin with catgut — without draining — unless there are present cavities or loculi causing you to fear the formation of a hæmatoma.

To apply the plaster, the patient is laid again flat on his back.

The apparatus is similar (as to shape, dimensions, and mode of construction) to the large plaster for coxitis, reaching from the umbilicus to the toes¹. It is left in position for 2 1/2 months.

In the case of bilateral coxa vara the operation will be performed,



Fig. 1135. — Same child — after the surgical operation; radio. taken on Sep. the 5th, 1911 — two months after the operations, when it came out of the plaster: both limbs are still in abduction. On the right side — a linear osteotomy was made — the osseous union is firm, but there is a slight over-riding of the two bony fragments. On the left side, on the contrary, where the osteotomy was cuneiform, osseous union has taken place without displacement or over-riding (which shows well the superiority of cuneiform over linear osteotomy as regards the orthopædic and æsthetic result) (see fig. 1136).

as we have said, in two stages (allowing an interval of 1 month between the two interventions).

After having been 2 or 3 months in the plaster, the limbs are freed: they will spontaneously return, little by little, to parallelism. There only remain to be carried out, massage, active and passive movements, progressive walking exercises with crutches at first, then with sticks, and lastly with only one ordinary walking stick.

1. For all the details concerning the technique of construction of a large plaster, refer to p. 426 and following.

The treatment is finished in about 6 months after the operation. And the functional results thus obtained are perfect, or nearly so.

Parents have brought to you patients who "ducked" at each step; you return to them children whose gait is normal.

In a word, we know, today how to cure the functional troubles of

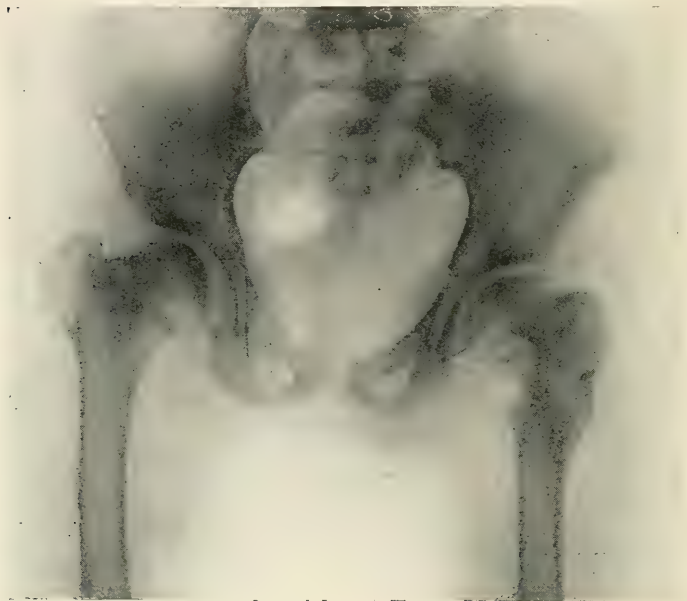


Fig. 1136. — Radio. taken 6 months after the operations, 5 Febr. 1912. One sees that the cervico-diaphysial angle has opened and that it actually measures about 120 degrees, that is, nearly the normal. The point of the trochanter is now lower and further away from the iliac bone; the same movement has brought the inferior insertions of the glutei muscles to their normal level. Here then is the anatomical cure. As to the functional result, it also is perfect... though not quite so on the right (linear osteotomy) and there is a shortening of 8 millimetres on this side, whilst the cure is absolutely faultless on the left, where the osteotomy was cuneiform.

coxa vara : 1st, by simple medical treatment (with rest and extension, for light cases) ; 2nd, by orthopædic treatment (stretching of the abductors and a plaster) in medium cases ; 3rd, by surgical treatment (linear or cuneiform osteotomy) in more serious cases.

And — which is not the smallest advantage of this healing therapeusis — it can be applied by all observant practitioners.

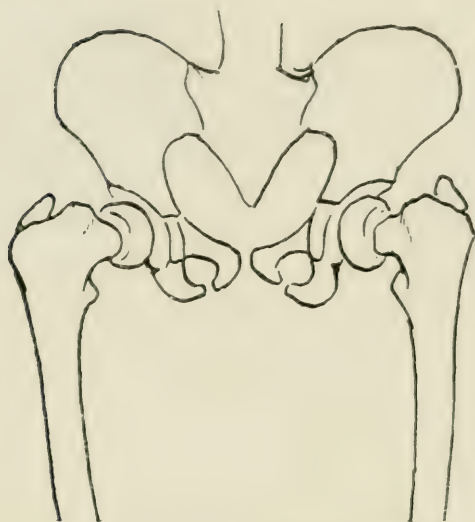


Fig. 1137. — Tracing from radio. fig. 1133.

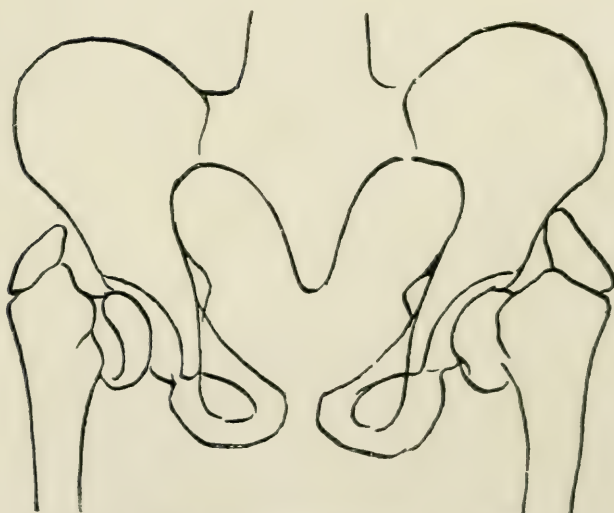


Fig. 1138. — Tracing from radio fig. 1134.

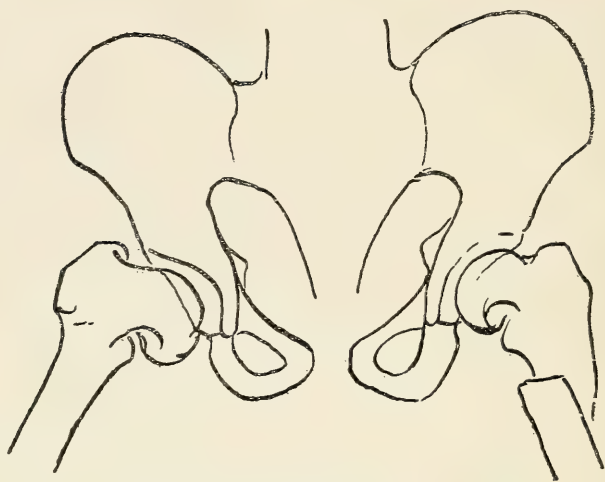


Fig. 1139. — Tracing from radio. fig. 1135.

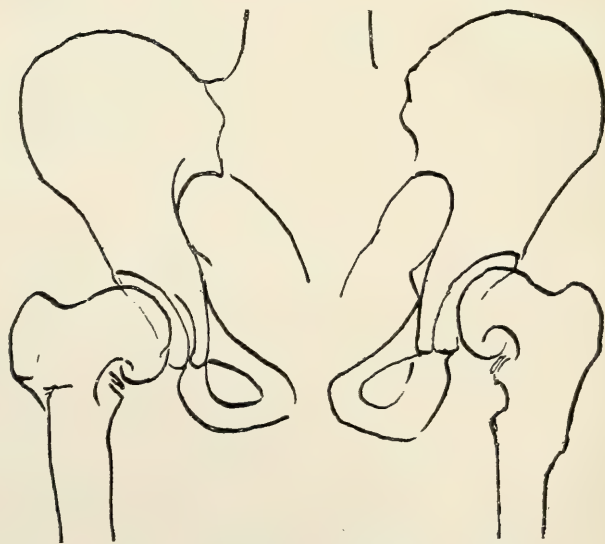


Fig. 1140. — Tracing from radio. fig. 1136.

APPENDIX

A NEW TREATMENT OF SCOLIOSIS BY ABBOTT'S METHOD

THE TREATMENT OF SCOLIOSES OF DIFFERENT DEGREES AND CAUSATION

The treatment of scoliosis has lately entered upon a new era of unlimited progress, thanks to Abbott.

Every one speaks of Abbott's method, but how few understand it! And how could it be understood seeing that, as yet, it has nowhere been explained, neither in France nor abroad, with the simplicity and clearness demanded by the complexity of its details.

A great number of practitioners have asked us to supply this want. We respond here to their request and can do so the more easily as Abbott himself has been and applied his treatment in our wards at Berck. This was his first demonstration in Europe.

We, ourselves, have applied this new treatment to 50 of our patients. But, not content with this and in order to grasp still more thoroughly all the details of the method, to know its latest improvements, we have sent to America our assistant, Dr Fouchet, in order to see Abbott "at home", in his own surroundings, to see his patients, present and past.

It is after all this, after Abbott's experience as well as after

our own, that we will describe, for practitioners, the technique of the method, its true import, its indications, its limits.

Then we will mention the treatment of scolioses, *high* or *cervico-dorsal*, which, from their position, are not reached by Abbott's plaster and which we treat by our large plaster enclosing the base of the cranium.

Lastly we will describe what must be the treatment of scolioses of various degrees (scolioses at the onset, scolioses of medium degree and those far advanced) and of various causation (essential scol. of adolescents, rickety scol., static scol., symptomatic scol., etc., etc.) — in short, we will indicate, by the light of new facts and observations, what must be *the* treatment of scoliosis, the one which will, in every special case, lead us most certainly to perfect cure¹.

I. — PECULIARITIES OF THE METHOD. — Abbott says : the child who has a bad attitude when writing has a physiological scoliosis, lateral deviation of the spine and external rotation of the vertebræ (fig. 1141).

This same normal child is obliged to produce a physiological scoliosis in the contrary direction (hyper-correction of the first), in order to flex his spinal column (fig. 1142); for, in extension, he cannot possibly produce rotation of the vertebræ.

So that if physiological and pathological scolioses are identical, we will be obliged, in order to correct the second, to place the back of the patient in flexion.

In order to prove the identity of these two scolioses, Abbott takes a normal person, in fact one of his medical students (fig. 1143 and 1144); he puts on him a corset so constructed as to produce a scoliosis (fig. 1144) and, when he frees him from the plaster, the subject presents a right scoliosis (fig. 1146) with

1. Here will be found the substance of several articles on Abbott's method published by us either alone or in collaboration with our assistants Dr Bergugnat of Argelès-Gazost, Dr Fouchet of Berck and Dr Privat of Paris.



Fig. 1141. — A child writing with a bad attitude. He has a physiological scoliosis, lateral deviation of the spine and external rotation of the vertebrae.

Fig. 1142. — This same normal child is obliged, in order to produce a physiological scoliosis in the contrary direction, to flex his spinal column.

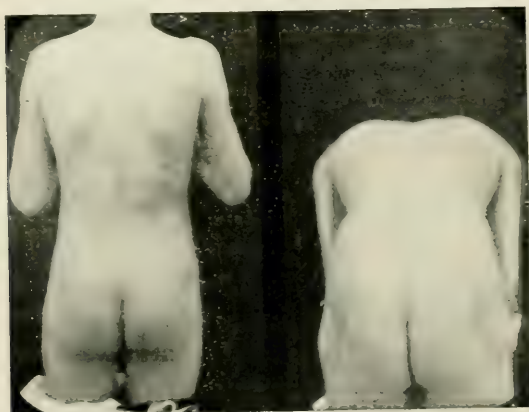


Fig. 1143. — A normal medical student on whom Abbott is going to produce a scoliosis.

Fig. 1144. — The same, to show that there exists no vertebral rotation.

rotation of the vertebræ (fig. 1147). Then he puts on him a new corset (fig. 1148), for hyper-correcting the right scoliosis by producing a new one, but this on the left side; and, when the subject comes out of the apparatus he has indeed a left scoliosis (fig. 1149) with vertebral rotation (fig. 1150).

The demonstration is made and the *flexed position* given to



Fig. 1145. — The same with a corset designed to produce a right scoliosis.

the back in order to produce those voluntary scolioses is the characteristic of Abbott's treatment. No doubt other parts of Abbott's treatment, such as his table, his corset and above all the synthesis of the thousand details of his technique, are important, but they do not characterize the method, for they had already been conceived and put to the test in a somewhat similar way; if they have not yielded the same results as when applied by Abbott, it has been because the spinal column was always maintained in extension.

In extension. the vertebral articulations are **interlocked**,

there is no possible movement; in **flexion**, on the contrary, the articulations become **mobile** and it is **possible**, in this **position**, to **correct** the **rotation** of the spinal processes, which was the stumbling block of the treatment of old scolioses.

II. HOW ABBOTT OBTAINS THE CORRECTION OF OLD SCOLIOSIS.



Fig. 1146. — The same with a right scoliosis.

Fig. 1147. — The same showing a rotation of the spinal processes.

— An orthopædic surgeon does not think he has obtained the correction of a deviation of the skeleton until he has placed the bones in a new vicious attitude, but this time, in a direction contrary to the first; this is the *hyper-correction*; for instance, an equinus-club foot will become a talus-club foot.

In order to obtain the hyper-correction of a scoliosis, Abbott makes use of a frame and a special corset.

Abbotts frame is represented in fig. 1151, 1153, 1154, 1155, 1156. It consists of a set of superimposed frames joined together by upright posts. We have had this frame constructed,

from Abbott's direction, in the workshops of the "Institut Orthopédique de Berck".

To the middle frame is fixed a piece of canvas; this is the bed, or better, *Abbott's hammock*.

This hammock is made of a piece of strong canvas cut in a special shape (fig. 1152). In a rectangular piece of canvas,



Fig. 1148. — The same in a corset designed to produce a left scoliosis, hyper-correction of the first.

slightly longer and slightly narrower than the back of the patient, one of the short sides is cut in a slanting direction at 45° .

This gives a trapezoidal rectangle whose short sides are fixed to two rods, both kept perpendicular to the long sides of the frame.

The result of this disposition is that when the short sides of the trapezoid are moved further away from each other one of the bases is tightly stretched, whilst the other is relaxed (fig. 1151).



Fig. 1149. — The same with a left scoliosis.

Fig. 1150. — The same with a rotation of the spinal processes inverse to that in fig. 1147.

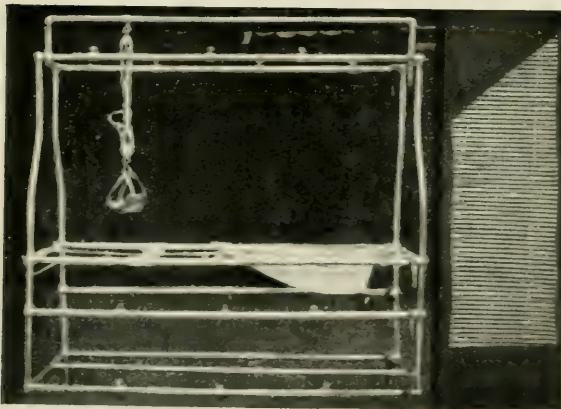


Fig. 1151. — Abbott's frame.

Fig. 1152. — Abbott's hammock

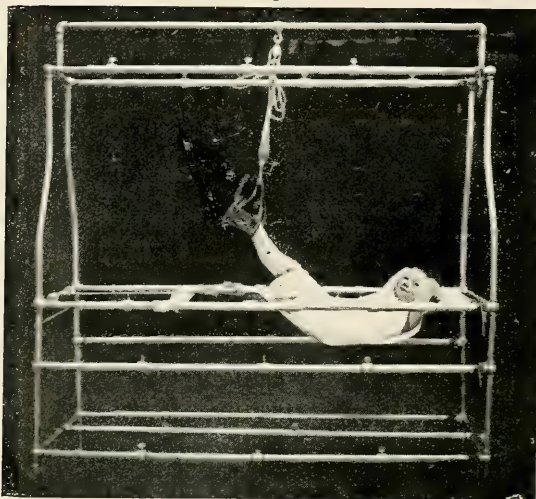


Fig. 1153. — A child in flexion on Abbott's hammock.

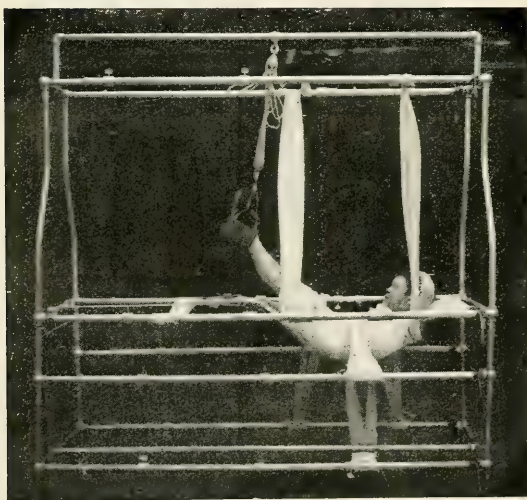


Fig. 1154. — A child fixed to Abbott's frame in the position he must be in for the construction of the corset (the vertical bandage starting from the pelvis ought to be slightly higher).

The trunk of the scoliotic patient is placed on this hammock in such a way that the convex side of the back rests on the stretched part of the canvas; consequently the concavity will be above the relaxed part. Then, by means of a pulley the feet are raised; a pillow is placed under the head: thus the spinal column is found in flexion (fig. 1153).

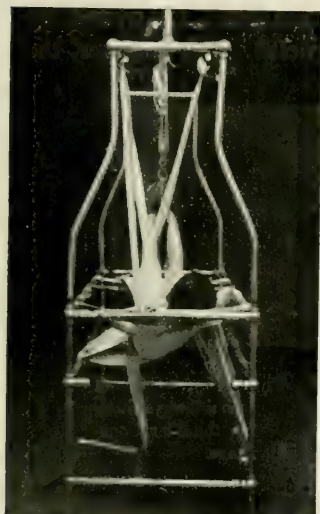


Fig. 1155. — The same viewed from the head.



Fig. 1156. — The same seen from above.

By means of bandages tractions are made on the trunk (v. fig. 1154, 1155, 1156).

A bandage with *three tails*, placed on a level with the prominent region of the ribs pulls, on the one hand, laterally on this prominence and, on the other hand, downwards on the trunk.

A second three-tailed bandage pulls, on the one hand, the pelvis towards the concave side and, on the other hand, upwards.

The arm on the concave side is pulled upwards and forwards; the other arm is pulled downwards and backwards.

The patient being fixed in this way on the frame, one waits a quarter or half an hour. If the tractions are too strong, they must be diminished; if, on the contrary, the bands are slack, they must be tightened.

Little by little the deviation is corrected. When hyper-correction is attained, or when the surgeon thinks that the correction obtained is sufficient (and it may be sufficient even if hyper-correction is not attained, as, in the corset, the correcting process will go on) the corset is constructed. If, however, the



Fig. 1157. — Corset with the large opening for decompression,

Fig. 1158. — Corset seen from front, showing the anterior opening.

Fig. 1159. — Corset seen sideways, showing the lateral openings.

deviation is not sufficiently modified, the patient is left free; and on following days he is again fixed on the hammock for one hour until, the correction obtained being sufficient, he can be put in a plaster.

How is hyper-correction to be produced, when it has not been obtained before the application of the corset?

It is produced thanks to the special model of Abbott's corset. On a level with the concavity, a large opening for decompression is made, reaching further than the median line, at the back (fig. 1160).

Then by means of small rectangular openings, situated one in the median line (fig. 1158), the other two at the anterior and posterior axillary lines (fig. 1159 and 1160), squares of

felt are pushed in; they will produce the compression (fig. 1160, 1161, 1162). Some of the squares, going from the median opening to the opening for decompression, will pass from forwards backwards and will help to correct the rotation; the others going from one of the lateral openings to the other, will press on the side of the trunk and tend to correct the lateral deviation of the spine.

As Professor Spitzzy has rightly pointed out, the thorax will tend to escape through the opening for decompression owing to its weight and to the movements of respiration. And indeed, during the days following the application of the corset, one sees the ribs forming a hernia, more and more marked, through the opening in the plaster. This action must be carefully watched over as, sometimes it progresses very rapidly and one may have to face an hyper-correction difficult to correct later on.

It is, then, by the position given to the patient on his frame, by the preservation and the exaggeration of this position in his corset, that Abbott obtains the desired hypercorrection.

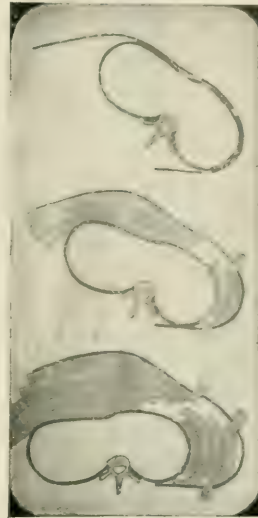


Fig. 1160. — Section of the thorax and of the fenestrated corset.

Fig. 1161. — The same after a slight compression. The correction is beginning.

Fig. 1162. — The same after a strong compression. Complete correction is obtained.

III. PRESERVATION OF THE CORRECTION. — When the scoliotic patient has been for 2 months in hyper-correction, that is to say when he presents a scoliosis in a direction opposite to that for which he was treated, he is freed from his plaster, but he is not left without apparatus; he must wear a celluloid

corset (fig. 1163, 1164, 1165). This movable corset still maintains the hyper-correction.



Fig. 1163. — Celluloid corset for left scoliosis seen from the back.

Fig. 1164. — Celluloid corset for right scoliosis; back view.

Fig. 1165. — Celluloid corset for left scoliosis; front view.



Fig. 1166. — A case of left scoliosis; the vertebral rotation is corrected but there still remains a lateral deviation.

Fig. 1167. — The plaster is broken off at its superior and inferior edges, on the convex side; and under the plaster, on the concave side, squares of felt are introduced.

Fig. 1168. — Then the corset is closed up again.

During the 6 months following its application the corset is worn day and night by the patient; however it is removed twice a day so as to allow special gymnastic exercises to be performed.

After 6 months the corset is done away with progressively, at first during the night, then every other day, etc., so that it may be entirely left off at the end of a year.

The treatment is then completely finished.

IV. DOES THE CORRECTION PERSIST? — Of course, if the scoliosis was due to a lack of equilibrium of the lower limbs, the



Fig. 1169. — A patient 19 years old.



Fig. 1170. — The same showing the costal prominence due to the vertebral rotation.

scoliosis will reappear as long as the cause remains. But in other cases, the correction is definitely accomplished.

Abbott has applied his treatment already for the last four years; the patients first treated have been freed of all apparatus for 3 years; and they have remained straight. This shows clearly that the cure is complete.

V. TO WHAT SCOLIOSIS MUST ABBOTT'S METHOD BE APPLIED? — It is evident that slight scolioses, recent scolioses of the first



Fig. 1171. — The same in her corset, showing hyper-correction of the lateral deviations.



Fig. 1172. — The same still in her corset, showing hyper-correction of the rotation

degree, must still be treated by the old methods which have already proved their efficacy. But we will presently discuss



Fig. 1173. — The same, showing hyper-correction of the rotation after removal of the corset.



Fig. 1174. — The same in the position of hyper-correction that had been obtained when the corset was removed.



Fig. 1175. — The same cured.

again the question of the treatment which henceforth suits best each form of the disease.



Fig. 1176. — A boy 15 year's old.



Fig. 1177. — The same, showing the costal prominence.

We will, however, mention at once that especially the old scolioses, the bad cases, those for which therapeusis was until



Fig. 1178. — The same cured.



Fig. 1179. — The same cured, there no longer exists rotation of the vertebra.

now futile or nearly so, those which had caused it to be said that scoliosis was the "disgrace of orthopædy" are those to be treated by this method.

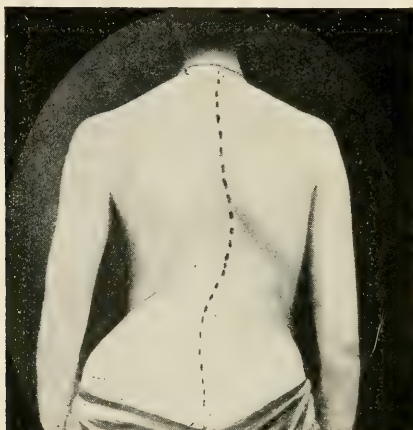


Fig. 1180 — A young scoliotic girl, 23 year's old.



Fig. 1181. — The same, showing a voluminous costal prominence.

But are all bad cases to be treated by Abbott's method?
Are there cases on the border line?

In the paper that he read to the « Congrès d'Éducation Physique » at Paris, Professor Abbott himself asked that question;

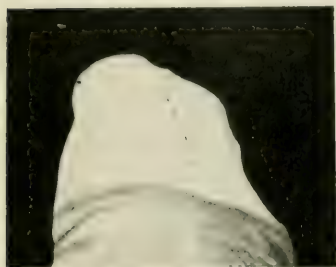


Fig. 1182. — The same showing hyper-correction of the vertebral rotation.



Fig. 1183. — The same showing correction of the vertebral rotation.



Fig. 1184. — The same, cured.



Fig. 1185. — A boy of 17.

and he answered it by showing the photos reproduced in fig. 1200 to 1207.

However, he added in conversation he had with us :
“ Doubtless there might still be found a few cases which will



Fig. 1186. — The same, showing a strong vertebral rotation.



Fig. 1187. — The same in hyper-correction (in his corset).

“ resist this method, those, for instance, presenting a too acute
“ costal angle; those accompanied by very marked malfor-



Fig. 1188 - Hyper-correction, in the corset, of the vertebral rotation



Fig. 1189. -- Position of hyper-correction as it was when the plaster was removed.



Fig. 1190. — Left costal prominence i. e. in a direction contrary to that observed before treatment (v. fig. 1186).



Fig. 1191. --- The same after 3 weeks of exercises : hyper-correction still persists, but it will disappear gradually, thanks to gymnastics.

“ maturation of the spinous processes, those of too old standing; but



Fig. 1192. — The same, showing correction of the vertebral rotation.



Fig. 1193. — Young girl suffering from grave scoliosis.

“ those scolioses must be very rare and at any rate, they can
“ be much improved ”.

Does this mean that every body will obtain results as beautiful as those obtained by Abbott?

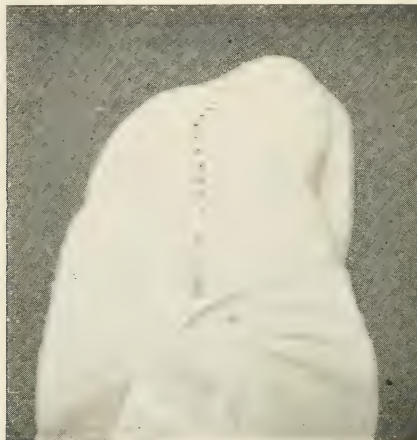


Fig. 1194. — The same showing vertebral rotation.



Fig. 1195. — The same, in hyper-correction in the plaster corset.

No, one must be thoroughly familiarised with the rather complicated technique of this treatment, to be able to fight and

to overcome very marked deformities. So that one must not proclaim the inefficiency of the method on account of the bad

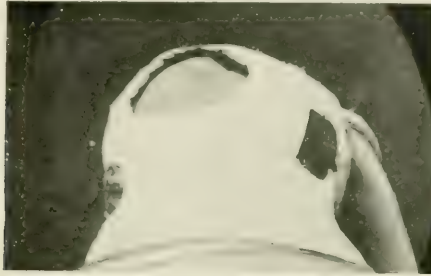


Fig. 116. — The same, in the corset, showing hyper-correction of the vertebral rotation.



Fig. 117. — The same, in hyper-correction, the plaster removed.

results obtained by certain persons and in certain special cases. Moreover, as Abbott says, these cases will become more and

more rare as his treatment becomes better known for, the



Fig. 1198. — The same, after having left off the plaster corset, showing hyper-correction of the vertebral rotation.



Fig. 1199. — The same, showing the suppleness of the back.

patients will have all and always been seen by a practitioner who



Fig. 1200. — The same, 3 weeks after removal of plaster.



Fig. 1201. — The same, 3 weeks after having left off the plaster; the vertebral rotation has disappeared.

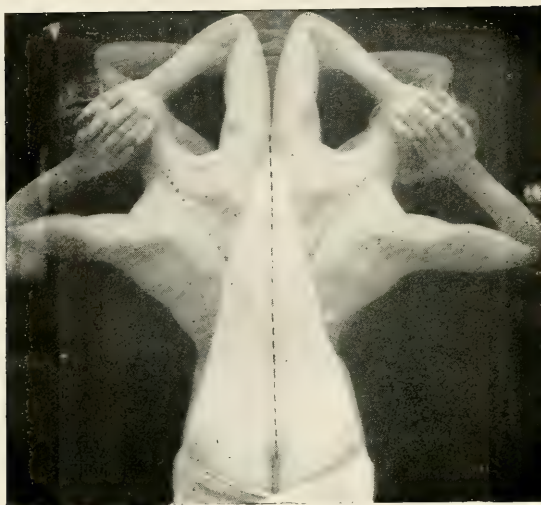


Fig. 1202. — The same, 6 months after the plaster : straightness and suppleness of the back.

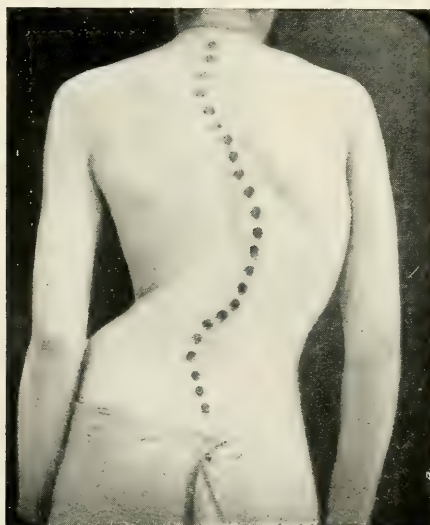


Fig. 1203. — Very severe scoliosis. In face of such advanced cases, Prof. Abbott wonders if there are « boundary cases », beyond which his method is helpless. He answers by showing the following photos.

has been able to treat them during the period when their disease

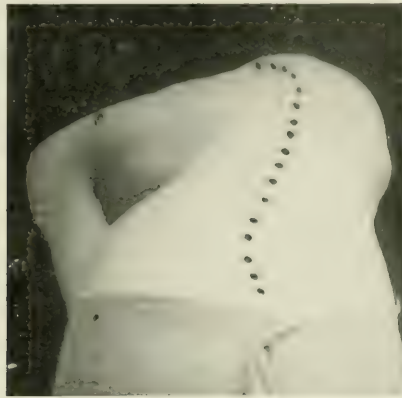


Fig. 1204. — The same; there is an enormous vertebral rotation.



Fig. 1204 bis. — The same, in the corset.

was still curable; and in the same way that congenital luxation



Fig. 1265. — The same, in the corset, showing that the costal projection has changed side.

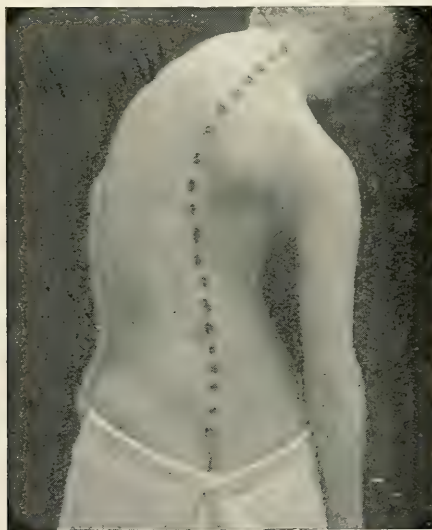


Fig. 1265 bis. — The same in hyper-correction when leaving off the plaster.

of the hip, gibbositities of Pott's disease are curable at a certain



Fig. 1206 — The costal projection has changed side

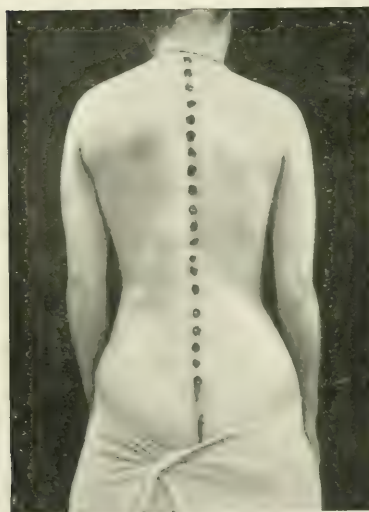


Fig. 1206 bis. — The same, completely redressed.

age and are no longer so at a later time, there is always a cer-

tain time when scolioses of the third degree are curable by Abbott's method.

The treatment of High Scolioses.

Abbott's method presents this serious shortcoming : it can do nothing against " high " or cervico-dorsal scolioses.

" Against the high scolioses ", said quite recently a follower



Fig. 1207. — The ribs are equally prominent on either side.

of Abbott's method, just returned from America, " nothing can be done and there is nothing to hope for ".

This is not our opinion : we will show that the high scolioses can be fought and treated, and their correction maintained, not with Abbott's corset but with ours (our large Pott's disease corset which encloses the base of the cranium).

In this way : suppose one of these scolioses with a right convexity the apex of which reaches the first spinal process (fig. 1208).

Both extremities of the scoliotic arch point to the right ; the inferior one corresponds to the middle of the trunk and the superior one to the cervical vertebræ and to the head.

In such a case we can act :

1st On the vertebral segment corresponding with the top of

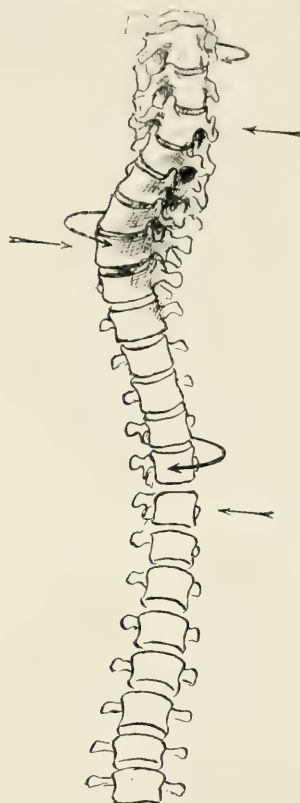


Fig. 1208. — High Scoliosis. — The top of the curve corresponds to the first dorsal vertebra. The arrows indicate the direction of the tractions and torsions to be made at the summit and the 2 extremities of the scoliotic curve so as to obtain its correction.

The 2 median arrows indicate the principal curve.

The 2 superior and the 2 inferior arrows show the 2 secondary curves.

the curve, so as to turn it from right to left and from backwards forwards, correcting thus its twisting, and to push it directly from right to left, correcting thus its lateral bend.

2nd On the vertebral segments corresponding to the extremities of the scoliotic curve, so as to turn them in a direction inverse to the summit and to push them from left to right (see the arrows of fig. 1208).

The result aimed at is quite clear, but how are we to reach it?

Here is what we have done for a high scoliosis with a left curve (v. fig. 1209 and following).

1. In order to act on the highest part of the curve we had to take the stump of the shoulder as a fulcrum or resting point; we began by surrounding it with a felt band the 2 extremities of which were stitched above the shoulder¹. Then we fixed the stump by means of a bandage formed of 3 strips uniting on a level with the middle of the spine of the shoulder blade (left).

Whilst one of the strips (*a*) is led to the right, remaining on the back, the 2 others (*b* and *c*) going towards the left will surround the stump of the shoulder and come forward from left to right. Do they pass above or below the shoulder? Both: above and below; that is, having met the stump of the shoulder, they have each been split in 2 equal strips (which gives us 4 half strips); the 2 superior half-strips have passed above the shoulder, the 2 inferior ones, below. They meet in front of the shoulder, on a level with the median third of the collar-bone (left) where they are united two by two, the 2 superficial ones together and the 2 deep ones also together, by means of two safety pins; when they are come to the front of the right shoulder, the 2 superior half-strips pass above it, here as on the other side, the 2 inferior ones below it; then the 2 superficial half-strips *b* join on to the first strip *a* to fix themselves with it to the right median rod of the Abbott's frame and help to correct the lateral deviation of the principal curve. The

1. After having placed a double thickness of felt under the right shoulder blade (concave side).

2 deep half strips forming band *c*, will serve to correct the torsion of the vertebrae; they are brought downwards vertically



Fig. 1209. — Our large plaster for high scolioses. The shoulder of the concave side is pushed from before backwards so as to augment the untwisting of the spine.

right under the inferior median rod¹, and hence turn from left to right to be fixed to the right inferior rod.

1. Which, in reality, must not be exactly median, but much nearer to the right rod.

It is easy to see how, by proceeding in this way, we can embrace the stump of the left shoulder, taking a resting point



Fig. 1210. — The plaster seen from behind with its large opening for decompression.

in front, on the clavicular and coracoid region, and behind on the spine of the shoulder blade; and thus, with these supports, we can act on the top part of the scoliotic curve so as to turn it and push it back in the desired direction.

2. In order to act on the inferior extremity of the scoliotic

are, we take hold of the median segment of the trunk in the usual way described by Abbott, and we rotate and push it back in a direction contrary to the former. That is easy.

But how are we to act on the superior extremity of the arc, that is, on the cervical vertebræ and the cranium? This is more delicate, but, nevertheless, feasible. We can do it by two different means : with bandages, or more simply with the two hands embracing the head which is brought *forward* as well as the cervical vertebræ (in order to effect the flexion of the spine, a necessary condition for the correction of scoliosis) and also *from right to left* (in order to correct the lateral deviation); and lastly, in order to correct the vertebral torsion the head will be rotated from right to left (about 80°) so that it faces nearly directly to the left, appearing to “face the lesion”, that is, the summit of the scoliotic curve. This attitude of correction of the head and the superior vertebræ is easy enough to effect; but how is it to be maintained? Will it be by means of a girdle embracing the base of the cranium (jaw-bone, chin and occiput) and pulled down by a weight, thus moving the head more and more in the desired direction? It could be done. But how much simpler and more practical, for this pressure of the head and cervical vertebræ, to have recourse to our large plaster corset embracing the base of the cranium (even, if need be, the whole of the head except the face) thus maintaining the correction very exactly (fig. 1209, 1210).

In order to be able to augment this correction during the days following the application of the plaster, it is well, when constructing the apparatus, to place *on the left* of the head, between it and the plaster 2 cushions made of felt (or of wadding stitched in a case of soft muslin).

As soon as the patient is accustomed to the apparatus, one of these cushions is taken out and placed on the right side of the head.

But there is yet a simpler method of attaining the same result : construct the plaster in the ordinary way (without the cushions)

and when you wish to begin the correction (the next or the third day) break open the whole of the left wall of the plaster minerva so as to free the head and the neck on this side towards which they will be pushed by introducing one or



Fig. 1211. — Pad placed on the shoulder of the convex side in order to augment the correction of the lateral deviation. — Another pad on the right of the head in order to react on the superior extremity of the scoliotic arc.

several felt cushions between the remaining right side of the plaster and the head.

Here is the method to be used in order to augment the correction already effected on a level with the summit of the scoliotic curve : 1. The untwisting is augmented by introducing felt pads in front of the right clavicle; they are slipped in through the median opening and their extremities reach past the free edge of the plaster, in front of the stump of the shoulder

(right). 2 The correction of the lateral deviation is augmented by pushing the stump of the shoulder (left) by means of a compressive dressing (felt or wadding) fixed to the right side of the plaster by soft bandages well tightened (fig. 1211, 1212).



Fig. 1212. — A spica of Velpeau bandage is applied to the stump of the shoulder (convex side) forcing it inwards by compressing the felt pad.

If it is thought advisable to leave the stump of the shoulder (left) free, two openings can be made in front of the stump and two behind it; the necessary compression¹ can be effected through those openings.

1. For high dorsal scolioses having their seat, for example at the level of the 5th dorsal, we make the compression under the axilla, using pads of the shape of a horse-shoe, their concavities being applied to the axillary fossa;

CALOT. — Indispensable orthopedics.

It is clear that, by acting on the same principles, it will be easy to increase the correction of the inferior extremity of the scoliotic curve.

Thanks to this technique and to a large plaster corset, the high scolioses¹, which, until now, one did not know how to treat, can henceforth be cured.

the concavity is made so that the vascular and nervous bundle is not pressed upon.

1. They are, moreover, not common.
-

CONCLUSIONS AND RULES FOR TREATMENT

HOW TO TREAT SCOLIOSES OF DIFFERENT DEGREES AND DIVERSE ORIGINS

And now, looking at it from a practical point of view, we will examine in what measure Abbott's method has changed the treatment of the several forms of scoliosis.

Can this method be applied to all cases? To recent scolioses, as yet hardly perceptible, as well as to old cases? To symptomatic as well as to essential scolioses? And amongst the very old scolioses, are there not some particularly malignant which stand out of reach of all treatments? Is there a limit to the method?

These are all questions, put by practitioners, to which we would like here to reply shortly but clearly.

THE SEVERAL VARIETIES OF SCOLIOSES. — We have said in Chapter VIII of this book that a great number of varieties of scolioses, based on their origin and their nature, have been described; we said also that they could all be reduced to the 3 following¹.

1st. **Common** scoliosis or scoliosis of adolescents, that which appears at from 11 to 16 years of age.

2nd. True **rachitic** scoliosis², that which begins (or rather which is noticed) at the age of 3, 5 or 8 years.

1. Congenital scoliosis is so rare that it hardly deserves mention. It is generally accompanied by a malformation of the vertebræ (the missing of half of a vertebral body). It will moreover be treated as rachitic scoliosis.

2. And we have also explained the way to distinguish it from the common scoliosis. The true rachitic scoliosis differs from the common scoliosis of adolescents, not only by the date of its appearance, but also by its *clinical* and *anatomical* form. The rachitic scoliosis is, during a very long time, manifested by a *single curve* (or rather, appearing single), the secondary curves (cervical or lumbar) having their seat very high and very low. The summit

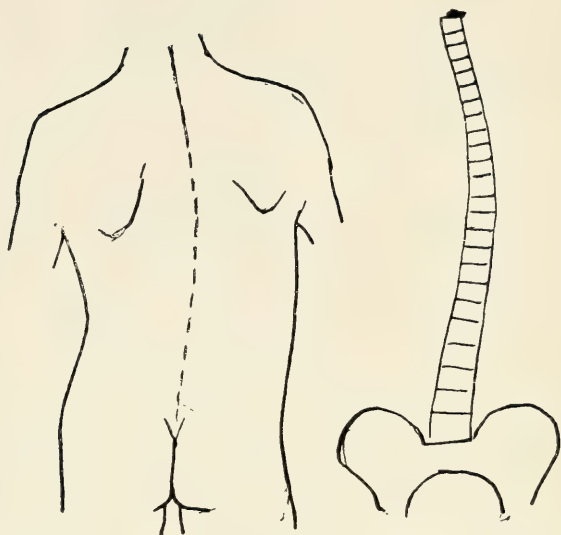


Fig. 1213. — Scoliosis of the 1st degree, with a single curve. Fig. 1214. — The same.



Fig. 1215. — The same. A slight prominence of the ribs on the right side can already be noticed : sign of the beginning of vertebral rotation.

of this great curve of rachitic scoliosis corresponds nearly to the *middle of the spine*, whilst in essential or common scoliosis (of adolescents), the curve, when it is single, has a smaller radius and its summit corresponds either to the back or to the loins; and later on, when there are two curves, the one is truly dorsal, the other distinctly lumbar, both having, generally, a practically equal importance.

3rd. **Symptomatic scoliosis**, which includes :

a) **Static scoliosis**, i. e. scoliosis symptomatic of a dispar

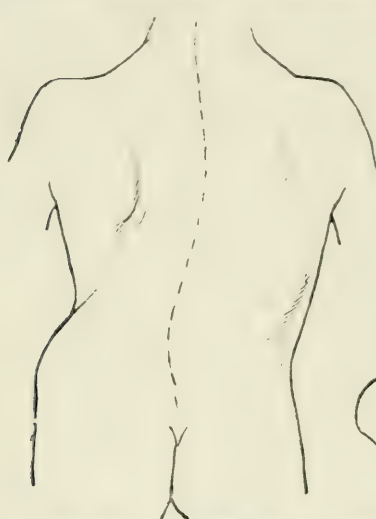


Fig. 1216. — Scoliosis with double curve (2nd degree).

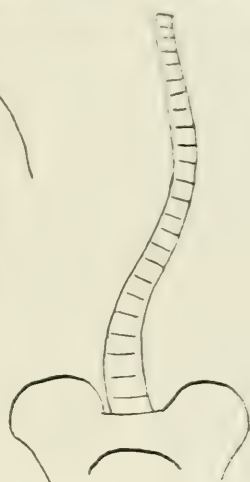


Fig. 1217. — The same from a radiograph.



Fig. 1218. — Scoliosis with treble curvature.



Fig. 1219. — The same from a radio.

ity of the lower limbs (hip-disease, congenital luxation of the

hip, infantile paralysis, etc.); in such cases, it is not sufficient to treat the scoliosis only, the condition of the lower limbs

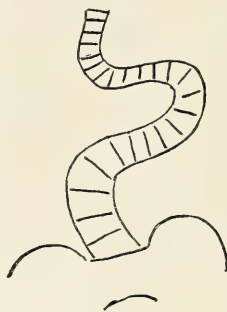
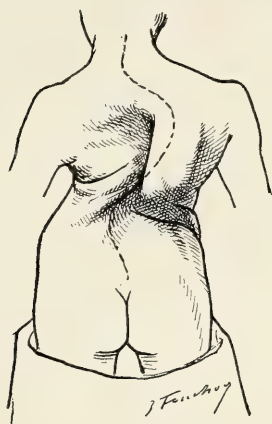


Fig. 1220. — Scoliosis with 4 curves.
Sc. "sigmoidal", or in Z, or in
"gimlet".

Fig. 1221. — The same from a
radiograph.

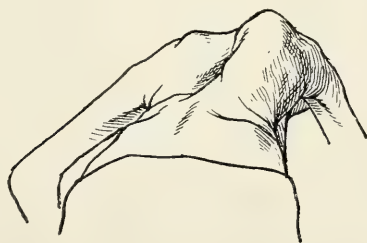


Fig. 1222. — The same. One sees the enormous prominence of the right ribs?
("melon ribs"), a sign of very pronounced vertebral rotation.

must be attended to as well, or, at least, the shortening must be compensated by an appropriate boot.

b) Scoliosis **symptomatic** of many other affections of the

trunk and their causations are very numerous : paralysis of the trunk, empyema, thoracic diseases, hemiplegia, deformities caused by torticollis, etc.

Are we going to treat all those scolioses by *Abbott's method*?

No.

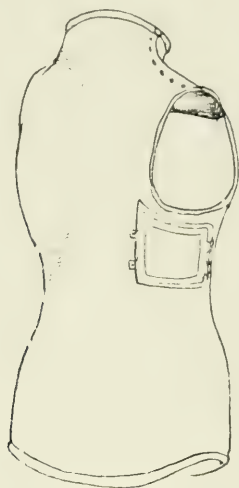


Fig. 1223. — Our celluloid corset for scoliosis of the 1st degree (seen from the right posterior side, 3/4). Corset for scoliosis with only one curve (1st degree). Sub-axillary opening on the convex side allowing compression by wadding to be made (4 or 5 squares of wadding of 1 cm. thick) in order to hyper-correct the lateral deviation. On the left (concave) side can be seen a " swelling " of the celluloid, allowing the thorax to develop freely on this side so as to effect the hyper-correction of the scoliosis.

IT IS NOT A QUESTION OF ORIGIN, BUT A QUESTION OF DEGREE
WHICH DIFFERENTIATES THEM AS TO TREATMENT.

In a few words : A scoliosis quite at its outset should not be treated by Abbott's method, whatever be its origin (because, as we shall see further, we can cure it by other means).

On the other hand, every scoliosis not quite recent ought to be treated by Abbott's method, whatever be the nature of its origin : *essential*, *rachitic*, *paralytic*, etc.

We are placed here as if we had to treat a club-foot.

Whatever be the causation of the club-foot (congenital, rachitic or paralytic) we have recourse, in order to redress it, to manœuvres very similar. Of course some variety will be harder to redress than another, the treatment may be more or less arduous, longer or shorter according to the case : but the

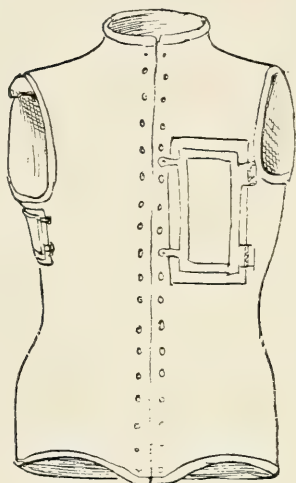


Fig. 1224. — The same celluloid corset (face view); anterior opening allowing wadding compression (5 squares of wadding, 1 cm. thick to be made, in order to hypercorrect the commencing rotation.

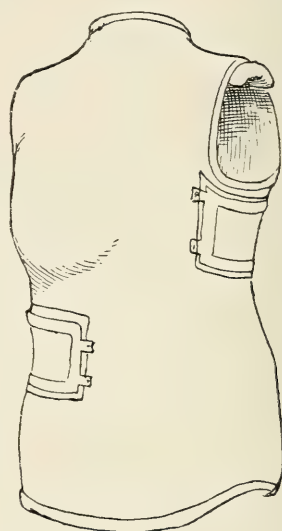


Fig. 1225. — Our corset for scoliosis with double curve (scol. of the 2nd degree) seen from behind. The inferior opening allows of the secondary lumbar curve being treated (compression by wadding). In front, the arrangement is the same as in fig. 1148.

redressing manœuvres will be practically the same, and after them, we apply the same plaster in all cases.

In the same way, in case of scoliosis, we must first straighten the back, which can be done by Abbott's method. After that, if it is a case of paralytic scoliosis, we may have to order a celluloid corset to be worn, just as, after redressing a paralytic club foot we are obliged to make use of an orthopædic boot. It is



Fig. 1226. — Some of our scoliotic patients under treatment at Berck.



Fig. 1227. — The same.

easy to understand these slight modifications in the treatment, especially in the treatment following the corrections, but, once again, scolioses of all those different origins come within the scope of Abbott's method.

Much more important is this :



Fig. 1228. — Young girl 20 years old, scoliosis dating 5 years.



Fig. 1229. — The same 3 months after beginning treatment by Abbott's method.

(This scoliosis, as well as all the following ones have been treated by us at Berck.)

THE QUESTION OF DEGREE OF THE SCOLIOSIS

This is what makes the difference in treatment.

Four degrees may be recognized in scoliosis, according as there are 1, or 2, or 3, or 4 curves.

1st degree. — Single bend.

2nd degree. — Two bends (dorsal and lumbar).

3rd degree. — 3 bends, in shape of an S.

4th degree. — 4 bends ("sigmoïdal", in Z.)

1st Degree. — *Scoliosis with single bend.*

In the case of a commencing scoliosis, hardly evident (of which you have just made the diagnosis), are you going to apply at once Abbott's method?

In the hospital, yes.



Fig. 1230. — Young girl 18 years old, scoliotic for the last 7 years.



Fig. 1231. — The same 2 months after beginning treatment by Abbott's method.

In private cases, *no*. Would you know why? Because the disease at this early stage can be cured otherwise; and as Abbott's treatment is not obligatory here, it is better to dispense with it, for it is too aesthetic and hence, too troublesome for the parents who wish above all that "it does not show", that no one may suspect their child's deformity.

At this early stage, the disease is not yet conspicuous; shall we make it so by a treatment which renders it noticeable by all?

Moreover, we would not be obeyed if we tried to force this Abbott's treatment on patients at this stage. I speak of private practice, for in hospitals, there will hardly ever be any objection, and there it is as well to treat all incipient scolioses by the same Abbott's method. But one must admit that it is very



Fig. 1232. — Young girl 14 years old, scoliotic for the last 6 years.

seldom that scoliotics at this early stage are brought to hospitals.

Therefore, in private practice, no Abbott's method for the first degree. Let us speak frankly : we, ourselves would not accept it for our own children since we can cure such cases without plaster and with a treatment that will not be conspicuous.

What will be the treatment of scoliosis of the first degree?

It will be the general treatment and the local treatment by active and passive redressing that we have already described at full length.

But to this classical treatment, we must add, which is very important, the use of the quite special celluloid corset such as we have constructed with our assistant, Dr Fouchet¹. With this special corset, cure is complete and certain; it is neither without it.

Are we to insist upon the necessity for this special corset?



Fig. 1233. — The same, 4 months after starting treatment by Abbott's method.



Fig. 1234. — The same. The hyper-correction is already slightly effaced.

Certainly, the redressment of this 1st degree of scoliosis can be easily obtained, at once, with the "passive" and "active" manœuvres described in Chapter VIII of this book, to which we refer you.

But the redressment will only be perfectly maintained from one gymnastic exercise to the other, by this special corset.

1. In the workshops of the Berck Institut orthopedique.

Without it, not only is the redressment not preserved, but the deformity becomes worse.

On the contrary, with the new celluloid, the redressing, instead of being lost, will progress and be completed; thus, in the same way as in our celluloid corset, classical to-day, with dorsal opening and shutter, allowing of a progressive compression, a gibbosity of Pott's disease is not only maintained at the degree of correction already obtained, but is more and more corrected.

And it is by considering what we used to do in our method of correction of gibbosities of Pott's disease as well as Abbott's method, that we have constructed the new model of celluloid corset.

The corset will have 2 openings, one postero-lateral (sub-axillary) on the side of the convexity, generally on the right, as in the case represented; the other, anterior, prethoracic, on the other side of the trunk.

The 1st opening will allow us to correct the tendency to lateral deviation; the 2nd, the tendency to rotation.

The necessity for this double progressive correction must be borne in mind when taking the mould; and, consequently a space is provided by placing 2 wadding cushions over the region of the trunk opposite the openings to be made¹. In this way is left in the celluloid all the space necessary for the expansion of the thorax in the desired direction.

That is the way in which we act on the summit of the scoliotic curve in order to correct the deviation and the slight torsion nearly always present. (See fig. 1223.)

Now, for the two extremities (we must not forget that here we have a single curve). The bend of the arc must be straightened in order to help the correction. How is the arc to be straightened in its upper part?

1. Or one could make, at this point of the corset, an opening which would remain patent.

a) *Superior extremity.*

One of the shoulders (the right, generally) is one centimetre higher : we produce the reverse in the celluloid, i. e. the left shoulder will be placed one and even 2 cm. higher than

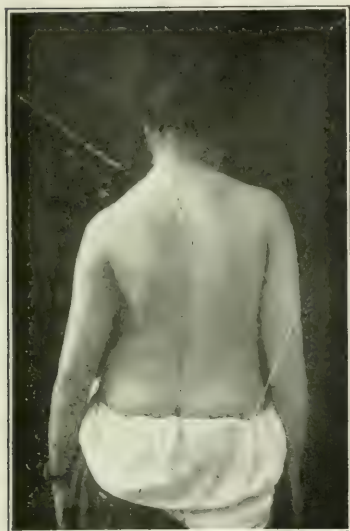


Fig. 1235. — Young girl 19 years old.
Has been a scoliotic for the last
5 years.



Fig. 1236. — The same, 2 months after
beginning the treatment.

the right; this will be a gain of 3 cm. over the previous relations.

And in order to make this inappreciable, the 2 shoulders of the celluloid corset are made at the same level; but the corset is notched 2 cm. lower at the right arm-pit than at the left and, moreover the shoulder piece of this same right side is padded with a small cushion 2 cm. in thickness (this will yield the two centimetres required).

b) *Inferior extremity of the scoliotic curve.*

In order to act on the inferior extremity, that is, to straighten

the lower part of the scoliotic arc, it is sufficient to place a small heel-piece of 1 cm. under the right foot (convex side), which lowers by the same amount the opposite side of the pelvis (and, consequently, straightens the lower part of the curve).

During the night, extension (of about 2 or 3 kilos) will be made on the left foot (concave side).



Fig. 1237. — Young girl 17 years old. Scoliosis dating 4 1/2 years.



Fig. 1238. — The same, 2 months after beginning treatment.

2nd Degree. — *Scoliosis with 2 curves.*

When dealing with these double curved scolioses (right dorsal principal curve and left lumbar secondary curve), it would be best to apply from the very first Abbott's method; this will always be done in hospitals.

But, in private practice, the parents will not always agree to this; well, then, we will institute a treatment analogous to that just explained for single-curved scolioses; that is to say passive and active redressing manœuvres twice a day, regularly,

as explained in this book (for Scoliosis of the 2nd degree, v. Chapter viii).

If need be, Abbott's frame may be used for correcting this scoliosis. After each sitting a celluloid corset will be applied; this corset, it is understood, will not be of the same model as that of the corset for single curve scoliosis.



Fig. 123 j. — The same again. 2 months later

In its upper part, it is true, it is constructed like the former, but it is in the lower part that it differs widely.

Here (double curved scoliosis) we make in the corset, a third opening, closed like the other by a shutter on a level with the secondary prominence. To this opening corresponds, on the other side of the corset, a depression made in the way described above.

In these cases of the 2nd degree (double-curved scoliosis), the patient will also wear a heel-piece of 1 cm. But this heel-piece, instead of being under the right foot (the side of the single dorsal convexity) will be placed in this case under the



Fig. 1240. — Young man 16 years old. Scoliosis dating 13 years.



Fig. 1241. — The same.

left foot (the side of the secondary lumbar convexity). The reason for this difference is easily perceived : here we have to straighten not only the single dorsal curve but the secondary lumbar curve as well. For the same reason the extension during the night will be effected here on the left foot (the side of the dorsal convexity).

3^d degree. — *Scoliosis with 3 curves.*

Here, without hesitation, in private practice as well as in hospital, Abbott's method must be applied from the very first, in the way explained above.

And the plaster will be worn for 4, 6, 8 months according to the case.

After that, one applies a celluloid corset in order to preserve the hyper-correction for some time longer, as is done in treating a club foot, after the plaster is left off.

The celluloid corset is removed 2 or 3 times a day, for gymnastic exercises, massage and baths.

Here, as in the case of club-foot, hyper correction must be discontinued very slowly, in the space of several months (6, 8 or 12 months).

4th degree. — “ *MALIGNANT* ” *Scolioses (with 4 curves).*
“ *Sigmoidal, in Z* ”.

Up to now, these scolioses were not thought to be amenable to any treatment.

We protest against this conclusion.

Doubtless, if the patient requires from us a complete cure, if he leaves no other alternative but doing nothing or achieving complete success, we will abstain : but these patients, so crippled as they are, are generally less exacting... and this, for obvious reasons.

They would be content with a mere improvement if they

could be assured of it. Failing a normal back, they wish for a not unsightly one.

Can we promise them such a result? Yes if the patient grant us 2 years.

Of what kind and of what amount will this improvement be?

It is possible to efface, for the greater part, the depression



Fig. 1242. — The same, 2 months after beginning the treatment.



Fig. 1243. — The same 15 days later.

and the flattening of the concave side of the back, to correct the position of the shoulder blades, of the shoulders and the hips so as to make them nearly symmetrical, with a thorax approaching the normal, and also to increase the height of the patient by several centimetres. And all this would give what I call a “not unsightly back”.

What will be the treatment for these unfortunate cripples and hunch-backs?

Shall they be put in plaster at once?



Fig. 1244. — Young man 17 years old; scoliosis dating 3 1/2 years.



Fig. 1245. — The same. 3 weeks after beginning the treatment.

This might be done; but it is by far preferable, in all respects, to make them undergo a preparation of several weeks before "fixing" them in a plaster for 2 or 3 months. This preparation will consist in one or two daily sittings for mobilisation of the spine (with the help of 1 or 2 strong persons).

After 20 or 30 minutes of manual manœuvres in order to



Fig. 1246. — Young girl 15 years old; scoliosis, with very sharp curve, dating 4 years.



Fig. 1247. — The same after 3 months treatment.

render the back supple and to redress it, we complete the sitting by placing the patient in Abbott's hammock and frame; then we fix the bandages for traction and detorsion as if we intended to put him in a plaster.

We pull on these bandages at the most for 10, 15 or 20 minutes, or even longer according to the amount the patient can bear and to his courage.

After that, we leave him free and we begin again, often on the same day, or, at any rate, on the following day and so on

daily for a few weeks, after which we will fix, "realize" the gain obtained, that is, we will plaster the patient.

In the plaster, the correction is still progressing thanks to the ordinary compression. And 3 or 4 weeks later, when the patient has quite recovered from the slight fatigue caused by the plastering, we change the apparatus. The plaster will be renew-



Fig. 1248. — The same, 3 weeks later. The hyper-correction is gradually effaced

ed in this way every month, for a year or even a year and a half. By these means, we will be able to increase the limits for the application of Abbott's method. We have already undertaken by this method the treatment of several cases which appeared to remain quite outside the scope of Abbott's method.

High Scolioses.

For the cases of high scolioses, fortunately rare, have recourse to *our own method* and to *our large corset*.

RÉSUMÉ

I. — *Scolioses with single curve.*

In the hospital, apply from the commencement Abbott's corset.

In private practice, apply the old treatment, but adding to it, which is most important, the use of our celluloid corset,



Fig. 1249. — Young man 15 years old. Has suffered from the age of a year and a half from paralytic scoliosis.

specially made for scolioses of the 1st degree (2 openings for compression and a heel-piece under the foot of the convex side) which alone can maintain and perfect the redressment.

II. — *Scolioses with two curves.*

In the hospital, always apply from the beginning, Abbott's method.

In private practice, always suggest Abbott's method; when parents do not accept it, treat the patient daily in Abbott's

frame and, between the sittings make him always wear our special corset (for cases of this 2nd degree, corset with 3 openings and heel piece on the concave side).

III. — *Scolioses with 3 curves.*

In private practice as well as in hospital, apply always and



Fig. 1250. — The same.

from the very beginning the Abbott's method¹, that is to say, plaster the patients.

IV. — *Scolioses with 4 curves (in Z).*

Here we can no longer speak of cure, but only of amelioration, very noticeable indeed.

In order to obtain it, treat your patients daily, during a few weeks, in Abbott's frame; then put them in plasters which you

1. We have seen in use the method of Mackensie-Forbes, which is a modification of Abbott's method. But this modification did not appear to us to present any appreciable advantage over the usual method of Abbott.

change every month for a year or a year and a half; after that make them wear celluloid corsets for one or two years.

V. — For *high scolioses*, apply *our method*.

And now, to finish, a word on the *future results* of Abbott's method.

This is what Dr Fouchet who went to the States, to



Fig. 1251. — The same.

Abbott's, in order to see the results he had obtained in some of his early cases, says :

“ Certain critics have doubted the persistency of the results thus obtained. ”

But Abbott can show scolioses cured for 3 years and which remain perfectly redressed.

And, moreover, why should the correction not persist here when it persists in other orthopædic affections? We speak, of course, of scolioses of the 2nd and 3rd degrees.

As to scolioses of the 4th degree, those extremely severe

forms, they will never be met with a few years hence.

Speaking of the old gibbosities of Potts' disease, our master Dr Calot said : " These old gibbosities ought no longer to be met with! There will be no more of them when all practitioners treat gibbosities at the outset, or gibbosities of medium gravity, by our method. "

In the same way here we can say that there will be no



Fig. 1252. -- The same 2 months after we had treated him by Abbott's method.

more incurable scolioses (or, at least, partially incurable) if all scolioses which have resisted the simple ordinary treatment by gymnastics and mecano-therapeutics are at once treated by Abbott's method.

So then, one can truly say that Abbot has solved the therapeutical problem for scoliosis as Dr Calot had solved it for Pott's disease (Dr Fouchet).

We will add one more word only. If, henceforth, all scolioses of the 1st degree be treated by manœuvres of active and passive

redressment, and, if need be, by daily corrections in Abbott's frame, adding to this the use of our celluloid corset¹ (which is very important) it would hardly ever be necessary to apply the plaster of Abbott's method; this plaster remaining as a sure resource in cases not treated, or ill treated during this first period.

So then it is now in our power to cure scoliosis.

1. *Journal des Praticiens*, 29th of march 1914. Abbott's method, by Dr Fouchet of Berck.

DETAILED INDEX

N.B. — This is a real compendium of the book.

I. Preface. - The treatment of orthopaedic affections from their beginning, rendered practicable for all interested practitioners. — Plan of the book.	3
The Hexalogue or the 6 commandments of Orthopaedics. 1) Early diagnosis. 2) Immediate treatment. 3) Perseverance in treatment. 4) The preparation of well fitting plasters. 5) In cases of tuberculouses do not open the focus, but puncture and inject it. 6) In the correction of tuberculous deformities, reduce traumatism to a minimum by proceeding rather by set stages.	7

GENERAL TECHNIQUE

OR

THREE PRELIMINARY CHAPTERS ON THE APPARATUS, ANÆSTHETICS. PUNCTURES AND INJECTIONS

FIRST CHAPTER

THE TECHNIQUE OF THE APPARATUS

1. THE PLASTER APPARATUS

A. Indispensable notions on the preparation of a plaster apparatus.

One should prefer, even for the treatment of fracture, circular plasters which fit better, are more agreeable to the patient and easier to make than splints.

In order to watch over the affected parts, with a circular apparatus, it is sufficient to make an opening over those points, or to convert the plaster into a bivalve.

To ensure the **good nutrition** of the member under treatment, it is sufficient to be assured of the good nutrition of the extremities of the toes or of the fingers, which should always be left exposed beyond the apparatus.

A plaster is prepared with muslin strips impregnated with plaster paste and applied entirely round the region of the body, covered with a casing of soft tissue.

One must therefore procure :

1 st A close fitting casing.	14
2 ^{dly} Some Paris plaster.	15
3 ^{dly} Some muslin.	16

The **casing** is of cotton : jersey, sock, stocking, or sleeve of a jersey — according to the region.

This lining is always thinner and more even than cotton wool. It is only in default of such a casing that one would use cotton wool, taking great care to apply it in a layer as even and as thin as possible (of a thickness of not more than 1 or 2 mm).

The **plaster bandages** are strips of muslin about 5 metres long and 15 cm. wide, which have been impregnated with plaster. 17

a) Either they are **steeped at the time in plaster paste** made with 5 parts of plaster and 3 parts of water, **cold, without salt**. 23

b) Or **sprinkled a little before hand** (one or few hours before) with dry plaster in the proportion of 60 grammes of plaster for each metre of bandage ; these strips are then soaked in cold water a few minutes before being used. 25

To prepare a firm apparatus it is well to insert a support of « attelles », or strengthening pieces, between the layers of the bandage. These attelles are simply pieces of muslin cut beforehand and soaked for a minute or two, before being used, in the same cream as the strips. 26

These « attelles » (there are two of them) have a length equal to that of the apparatus, a breadth equal to half the greatest circumference of the apparatus, and a thickness of one, two or even three sheets of muslin, according as the plaster is a small or a large one, and as it is for a child or an adult.

If it is a plaster for the arm, which ought to include the shoulder girdle, or a plaster for the lower extremity which should include the pelvis, a third attelle is introduced in the form of a belt, overlapping the upper margin of the two others.

The technique of the apparatus.

Suppose you have to make a **plaster** for the leg.

The **leg**, being covered with a casing, is placed in position, an assistant holding it and raising it by the foot. You apply the first plaster strip (beginning at the toes and the foot), in circular turns overlapping one third, without making reverses, which are un-

necessary. Take care to **apply** the strip : *a* **exactly**; *b* **without pressure**; *c* **flattening it well** so as not to leave creases. You ascend as far as the upper extremity of the apparatus, where you cut short the strip if it is not used up. 28

Over this first layer of turns of strips, **attelles** well smoothed down are applied, one in front, another behind. And over the attelles you apply further turns of strips, making thus a third or fourth covering, according as the case is a child or an adult. . . . 32

Between the different layers of the apparatus and over the last one some **plaster paste**, one to two centimetres in thickness, is applied 34

And that is all.

Then, **verify** and rectify, if necessary, the **position** of the limb; **mould** the plaster over the osseous prominences of the part by pressing, not immediately upon, but *around* those prominences; **maintain** it thus until the *complete setting* of the plaster. 37

A quarter of an hour later, **trim** the plaster. 40

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And, 2^{dly}, it should be moulded to the region. 62

b. **Comfortable,** — causing no discomfort and well tolerated. . . . 63

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1st Because it is not accurate.

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Do not pull or press much on the plastered limb before the setting of the plaster. 66

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CHAPTER III

THE TECHNIQUE OF PUNCTURES AND INJECTIONS

I

In suppurated tuberculoses.

This technique is the same for all tuberculous suppurations, for hip and Pott's disease with suppuration as well as for cold idiopathic abscesses.

A. What it is necessary to obtain	118
1° As to instruments; a needle, number 3, a small aspirator, a glass syringe (all these instruments should be capable of being boiled).	118

- 2° As to **modifying liquids**; 2 flasks, one of **oil, creosote, and iodoform** (oil 70 grammes, ether 30 grammes, creosote 5 grammes, gaïacol 1 gramme, iodoform 10 grammes). 125
- The other of **naphthol camphor with glycerin** (naphthol camphor 2 grammes, glycerin 12 grammes); this second mixture should be shaken vigorously for a minute and a half and injected **immediately**, because it is very unstable.
- These two liquids are all that are required 125
- The **indications for each**. As a general rule, inject the first of them (the oil). — You may reserve the second (naphthol camphor) for the case where an abscess contains clots blocking the needle, in which case two or three injections of naphthol camphor will soften and dissolve the clots; after which, you return to the first liquid. 126
- The **dose** to inject is the same for the two liquids, namely; 3 to 12 grammes, according to the age of the patient, for abscesses of a capacity of 20 cc. and over.
- If the abscess is very small, less than 20 cc., you inject half as much liquid as of the pus withdrawn. In this way all hyper-tension of the skin is avoided 142
- 3° Have also : a) a tube of *ethyl chloride* for local anæsthesia and some *tincture of iodine* for sterilization of the skin; b) a small boiled cup, to contain and take from, the liquid to be injected; c) and, lastly a sterilized dressing 116
- B. The Technique** 128
- When should you commence the punctures?* 129
- Immediately the abscess is plainly perceptible, provided you can get at it without danger. (But this danger only exists for deep abscesses in the iliac fossa; here, you may postpone the puncture until the abscess has become easily accessible).
- For this technique, there are two recommendations; be *very clean* and use *fine needles only*.
- a. To be **very clean**; be quite sure of the asepsis of your hands, of the patient's skin, of the instruments, of the liquids to be injected, of the after-dressing 131
- b. Employ only **fine needles** instead of the large trocars generally used; keep to our No. 3 needle (which has an outer diameter of only one and a half millimetres). 134
- Needle N° 4 must only be used when the abscess is far removed from the skin and its contents very thick. In no case should a needle larger than N° 4 be used.
- Other Recommendations.*
- c. **Puncture in healthy skin**, at a distance of 4 or 5 cm. from the abscess, in such a way that the two orifices in the skin and the abscess are separated by a long oblique track 134
- d. And at **each new puncture**, prick the skin at a **new point**. 143
- How many punctures?**
- You may make several punctures and injections (from 7 to 8 and not one only) — for the cures will be so much more certain than with one puncture only. 144
- At **what intervals?** 144

- When should the second puncture be made? Ten days after the first . . . 142
- And the others at equal intervals of from **10 to 12 days**. After the seventh or eighth sitting, the walls of the abscess are so sound, so healthy, that it only remains to seek for their **adhesion** . . . 145
- With this object, at the last sitting, after having made a last puncture (without injection) you **compress** the region, beginning at the extremity of the limb, with layers of cotton wool, held in position by 2 or 3 Velpeau bandages. — Every four or five days one adds over this dressing a new Velpeau bandage which keeps up the pressure to the degree required . . . 147
- On the fifteenth or twentieth day, the dressing is discontinued. The abscess is cured. 148
- The duration of treatment of a cold abscess (essential or symptomatic) takes then, from two to three months on an average.
- Nine times out of ten this will be the course of events; very regularly, without incidents and without a slip.
- The tenth time certain incidents *will* happen, which we will mention together with the method of overcoming them.

Possible incidents in the course of punctures and injections.

- A. **Immediate accidents** (which may happen even in the course of puncture).
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 - b. What is to be done in case of « negative puncture » 148
 - c. When blood is drawn. 151
 - d. When the cutaneous orifice is obstructed by some granular débris after removal of the needle. 152
- How to act when at the first visit of the patient, the skin is already reddened and on the point of bursting. 153
- B. **Consecutive incidents** (arising after one or several punctures and injections).
- a. The skin becomes red and thin after one or several sittings. — What is to be done in such cases? 155
 - b. The abscess does not dry up. 155
 - c. Infection of abscess occurring in the course of treatment 157
 - d. Opening of the abscess 161
- How to act in these several cases.

II

Technique of injections, in the dry or fungating tuberculoses.

One must endeavour to effect **either the hardening** of the fungosities, which is in itself a cure, **or their softening, after which they can be punctured** as above, which is a second curative method.

Which ought one to seek for? Hardening or softening? 166

For recent tuberculoses and of benign appearance, try hardening 167

For old tuberculoses of grave appearance, try softening.	164
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To produce hardening, inject creosote oil and iodoform.	
To obtain softening, inject camphorated naphthol and glycerine	
or our mixture of equal parts of sulfuricinated phenol, camphorated	
phenol and naphthol and spirit of turpentine.	
b. Instrumentation.	164
The syringe of ordinary glass.	
Needles N ^{os} 1 and 2 (for oil, n ^o 1; for camphorated naphthol and	
glycerine n ^o 2).	
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Technique for producing softening	165
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How to regulate this reaction	167
The indications and method of employment of our mixture of 4 li-	
quids as a softening agent for external tuberculoses.	168

III

***Technique of injections in the treatment
of tuberculous fistulæ.***

Of all the treatments proposed against tuberculous fistulæ, treatment by injections is the best in most cases.

Substances for injection. After having tried all the most famous liquids and substances, we have come back, always, to our injections of oil, creosote and iodoform, and naphthol camphor and glycerine. 171

These 2 medicated agents are employed in the liquid form whenever the anatomical disposition of the orifice and of the fistulous track allows the liquid to be retained in place 172

In all other cases they are employed in the form of paste 174

Formulæ and method of employment of our pastes for injections. 176

SPECIAL TECHNIQUE

OR

A STUDY OF EACH EXTERNAL TUBERCULOSIS AND OF EACH DEFORMITY IN DETAIL

FIRST PART

ACQUIRED ORTHOPÆDIC AFFECTIONS OF TUBERCULOUS ORIGIN

CHAPTER IV

INDISPENSABLE NOTIONS ON THE TREATMENT OF EXTERNAL TUBERCULOSIS

A. What ought to be the state of mind of practitioners when treating external tuberculoses.

A simple visit to Berck (*The rendez-vous* of external tuberculoses) would put them in this proper state of mind, by teaching them :

- 1st The **long duration of these affections** which is that of one year for a minimum and often several years. 183
 - 2^{dly} The **necessity** for all patients to live out of doors from morning to night, in all seasons and in all weathers. 183
 - 3^{rally} The **necessity** of rest in the **recumbent position** until cure is certainly attained. 183
- How easily these two indications for outdoor life and recumbent position, which seem irreconcilable, are met, by putting the patient on a « cadre » which can be removed into the open air on a chassis or a small carriage. 183

- 4^{thly} The fallacy of the wide-spread belief that patients will be *wearied* and *pine away* in the recumbent position. — On the contrary they grow fat and become stronger. 186
- 5^{thly} That difficult and nevertheless most important thing — to abstain from operating on these patients. 188
- Here is, in a few words the *formula of treatment* for external tuberculoses :
- Rest — Life in the open air — Modifying injections — Well-made apparatus — No operation or violent redressment.**

B. Prognosis of external tuberculoses — The risks of death and the means of preventing them.

THREE RISKS OF DEATH

1. **Amyloid degeneration of the liver and kidneys** which cause 9/10 of the deaths due to external tuberculoses. 192
- This degeneration is caused by secondary septicæmia brought about by the opening of the tuberculous foci. 192
- Therefore to avoid it, never open a tuberculous focus and do not allow it to open spontaneously. 195
2. **Generalisation of tuberculosis — in the lungs, kidneys, bladder.** 196
- It can be avoided by the general treatment already described and by the local treatment indicated further on (See C.). 199
3. **Meningitis** 201
- This is also avoided by a good general and a good local treatment (abstain from all surgical interference and from violent redressment).

C. Local treatment of external tuberculoses.

Respective value of the different treatments (operation, abstention, injections).

1. **In suppurated tuberculoses** 204
- Operation** is to be **disregarded**, for it rarely cures, aggravates often and mutilates always. 211
- Abstention.** — The conservative treatment, without injections is, on the whole, better than surgical operation, but it is *too long* (3, 4, 5 years and more) and above all, it is *too uncertain* (it fails in half the cases). 210
- Injections.** — On the contrary, injections (preceded by puncture of the abscess) cure always or nearly always (99 times out of 100, perhaps); they cure relatively quickly and without mutilation. . . . 213
- Moreover this treatment is benign, practical, of easy application everywhere, by all and for all.
- But if it is to yield such good results it must be carefully applied —

according to a certain technique and with an *absolute asepsis*.
If applied carelessly it will not give the promised results 214

2. In **dry or fungous** tuberculoses.

Here again in the case of dry or fungous tuberculosis the treatment by injections is the choice treatment, and is to be preferred to operation or abstention.

And yet, this is no longer absolute. There are a few cases of dry tuberculosis where the surgical extirpation or the strict conservative treatment (without injections) is indicated. Exposition of these exceptional cases. 214

3. In cases of **fistulous** tuberculoses.

Modifying injections are here again the most efficacious treatment; this is shown by the comparison of the several suggested methods which follow. 217

- a) Value of **operation** in tuberculous fistulæ. 229
- b) Value of abstention. 235
- c) Value of the **physiotherapeutic** methods (X rays, heliotherapy, sun cures), balneotherapy (sea water, thermal waters, mineral waters). 235
- d) Modifying **injections**. 236

The injections are very superior to all other treatments. But, nevertheless, they are contra-indicated in cases of infected fistulæ (where fever or albumen are present); in this special case abstain from injections. 236

Classification of tuberculous wounds, ulcerations, or fistulæ in four groups. 218

- a) Tuberculous wounds of the skin. 219
- Their treatment. 237

- b) Symptomatic fistulæ of a tuberculosis of the soft tissues (adenitis, epididymitis or orchitis, fungous synovitis, etc.). 222
- Their treatment. 237

- c) Symptomatic fistulæ of **superficial** lesions of the skeleton (spina ventosa, osteitis of the clavicle, of the malar bone, osseous or articular lesions very near the skin). 223

This group comprises nearly all the osseous fistulæ, except those of hip or Pott's disease 223

Their treatment. 237

- d) Symptomatic **fistulæ** of **deep** lesions of the skeleton where drainage is difficult. 224

In this group are included the fistulæ of hip disease, Pott's disease, certain fistulæ of the knee, and even of the ankle or the shoulder, or the wrist, etc. 224

Their treatment. 238

CHAPTER V

POTT'S DISEASE

Indispensable Anatomical and Clinical Notions.	239
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Symptoms — 5 Cases

1 st Pott's disease before gibbosity (or <i>without</i> gibbosity). The disease shows itself : a) by spontaneous pains, local or distant, or by pain provoked by pressure or « succussion » of one or several spinal processes; b) by vertebral stiffness, attitude and stiff gait of the subject, etc.	239
2 nd Gibbosity . — How is the gibbosity produced? — Stages and ultimate termination of the gibbosity. — Characters of gibbosity in Pott's disease : angular, median, painful on pressure.	240
3 rd Abscess . — Seat and mode of production of abscesses.	242
4 th Fistulæ	242
5 th Paralysis . — Causes and mechanism of paralysis.	243

Evolution and prognosis of Pott's disease.

a) When it is not treated; b) When it is treated.	244
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Diagnosis of Pott's Disease.

a) When there is a gibbosity.	246
b) When there is no gibbosity, but only functional troubles, or an abscess, or paralysis.	249

The Treatment of Pott's Disease.

- 1st *part* : will describe what is to be done in each case.
 2nd *part* : **How** it must be done, or the technique itself.

FIRST PART. THERAPEUTIC INDICATIONS.

- A. **Treatment common to all cases**, or treatment of the tuberculous focus.
- i *General anti-tuberculous treatment*. Life in the country or better, at the sea-side, during 2 or 3 years.
- II. *Local Treatment*.
- a) Rest in the recumbent position for two years.
- b) A plaster during two years, then a celluloid corset for two, three or four years, that is to say, until complete cure of the tuberculosis and the welding of the diseased vertebræ is accomplished; as in case of fracture, the apparatus is to be retained until after the formation of a solid callus. — As fracture signifies, for all, immediate plaster, so Pott's disease must mean immediate support by a plaster corset.

B. Therapeutical Indications special to each Case.

1st CASE. **Pott's disease without gibbosity** (rare). 256
 Even in this case the plaster is necessary (in addition to rest) to prevent with certainty the appearance of a gibbosity. 256

2nd CASE. **Pott's disease with gibbosity** (much more frequent). 258

The treatment of the gibbosity is the capital point in the treatment of Pott's disease. 258

One must : a) Prevent the gibbosity.

b) Correct it, if possible.

Can it be corrected? Yes, (except in cases of pronounced gibbosities of four years standing or more, where nothing can be done). But much is still possible, generally speaking, when these patients are brought to us, that is to say from the first to the sixth month after the appearance of the gibbosity.

This possibility has been vehemently denied, but above the theoretical objections, which seem the best proven, stand **the facts** which show this possibility and which are of two kinds :

1st *Radiograms* of redressed children, showing that osseous union has taken place between the vertebrae ;

2nd *Clinical observation* of redressed children, who remain straight without corset.

And this correction can be attained nowadays by a harmless treatment, simple and well-regulated.

To make sure at the same time of the **efficiency** and **innocuousness** of the treatment, it is sufficient to attend to the two following conditions :

a. *Seek for this correction chiefly from the direct compression* of the gibbosity through a dorsal opening in the plaster, and expect relatively little from the extension of the spine (keep to the extension that can be got in the standing position, *without the heels leaving the ground*; stretch, do not suspend).

b. Perform the *redressing progressively*, by stages, 8, 10, 12 sittings (one each month), *rather than roughly* in one sitting.

This double indication is fulfilled by a single application of a **large plaster**, made during the tension of the spine, having a **dorsal opening** for the compression of the protruding vertebrae.

(This compression can be renewed at will, without having to remove the plaster).

3rd CASE. **Pott's Disease with Abscess**. 265

The formula for the treatment of abscesses; three aphorisms.

a. *Prohibition* of interference with the abscess if it is not easily accessible, in which case it does not threaten the skin.

b. *Permission*, and even indication, to treat it if it is not easily accessible, even if it does not threaten the skin.

c. *Urgent necessity* to treat it when it does threaten the skin, in which case it is always easily accessible.

By treating the abscess is not meant *opening it* — as these abscesses must never be opened — but *puncturing and injecting it*.

4th CASE. **Pott's Disease with Fistula**. 270

How to recognise a fistula which is infected from one which is not?

- a) If it is *not infected* (no fever or albuminuria) make the same modifying injections as for a closed abscess, taking care that the liquid remains in place, which is effected by simple mechanical means.
- b) Against the *infected fistula* (fever); *no modifying injections or operations*, for they would only make the situation worse. Confine yourself to aseptic dressings and to general treatment; at the most, try drainage.

5th CASE. Pott's Disease with Paralysis 271

Here again, *no surgical operation*, which would do twenty times more harm than good. But to release the spinal cord compressed forward, apply a large plaster during extension of the spine, adding to it a dorsal compression of cotton wool.

2nd. PART THE TECHNICAL TREATMENT.

In reality the whole of this technique consists only in being able to make :

1st. A plaster corset; 2nd. Punctures and injections.

A. PLASTER CORSET 274

1st. Choice of model of corset 275

There are three models :

- a) *The medium plaster* with an « officer's collar »; for Pott's disease situated **below the 6th. dorsal vertebra**.
- b) *The large plaster with the funnel-shaped collar* supporting the base of the skull; for Pott's disease situated **above the 6th. dorsal vertebra** and for all Pott's disease **with paralysis**, wherever their seat.
- c) *The small plaster* without collar; this is an apparatus for **convalescence** in Pott's disease of the **lower** regions.

2nd. Construction of *medium plaster* (with officer's collar). 276

Position of patient; upright position — *stretch*, but do not *suspend*. . . 276

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The occipito-mental girth 279

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Some particulars to be noticed in the construction of a plaster corset;

- a. by preference use here rather plastered bands *prepared beforehand* (see p. 25); number of bands; from two to six or seven, according to age of patient.
- b) Preparation of the plaster cream (for the attelles and the mortar uniting the different layers) thinner than that for plasters of the leg; one takes 4 cups of water, instead of 3, to 5 cups of plaster.

Mode of preparing the « attelles » (3 in number) 286

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HIP DISEASE

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What must be the specific treatment?

Mercury or iodide? By preference iodide, or better still, mercury and iodide associated.	950
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b. It is not always harmless	959

- Begin by opening and **draining the abscess of the soft parts**. If, 3 or 4 days after, the fever has not fallen, trephine the bone. But this trephining will hardly be necessary once in four times. . . . 959
- B. 2nd form. **Very acute osteo-myelitis**, with fever of 40 deg. (104 deg. Fahr.) and grave general symptoms endangering life. . . . 959
- In this second form it is best to **trephine** the bone at once, but **omitting resection of the diaphysis** (which would be mere groping in the dark at this period). . . . 959
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The treatment of chronic and fistulous osteo-myelitis consist in searching *every 4 or 5 months* for a sequestrum which can be removed. **If there is no sequestrum** there is nothing to be done but to **wait** another 4 or 5 months (draining and practising asepsis) until the dead bone is detached. . . . 962

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- This deviation is composed of 3 factors : *a*) retraction of the tendo Achillis; *b*) retraction of the aponeurosis of the foot; *c*) forced extension of the big toe. 981
- Correction can be obtained by simple orthopædic manœuvres, or by tenotomy and aponeurotomy. The best way is to associate both these methods, namely, to begin with section of the tendo Achillis, of the aponeurosis of the sole and of the tendon of the extensor of the great toe, then finish with corrective orthopædic manœuvres . . . 981
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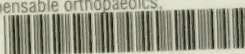
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